REPORT DOCUMENTATION PAGE

Form Approved
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Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	7 June 1996	Master's Thesis, 2 Aug 95-7 June 1996

4. TITLE AND SUBTITLE

DETERMIINING THE MILITARY VALUE OF ARMY INSTALLATIOINS DURING BASE REALIGNMENT AND CLOSURE

5. FUNDING NUMBERS

6. AUTHOR(S)

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7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

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ATTN: ATZL-SWD-GD
Fort Leavenworth, Kansas 66027-1352

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

Approved for public release; distribution is unlimited

12b. DISTRIBUTION CODE

A

DTIC QUALITY INSPECTED 4

13. ABSTRACT *(Maximum 200 words)*

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14. SUBJECT TERMS

BRAC, Base Realignment and Closure, Downsizing, Military Value

15. NUMBER OF PAGES

145

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED

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DETERMINING THE MILITARY VALUE OF ARMY INSTALLATIONS DURING BASE REALIGNMENT AND CLOSURE

A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirements for the degree

MASTER OF MILITARY ART AND SCIENCE

by

CHARLES V. FLETCHER, MAJ, USA
B.S., Tennessee Technological University, Cookeville, Tennessee, 1980
M.S., Naval Postgraduate School, Monterey, California, 1989

Fort Leavenworth, Kansas
1996

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THESIS APPROVAL PAGE

Name of Candidate: MAJ Charles V. Fletcher

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the forgoing statement.)

ABSTRACT

DETERMINING THE MILITARY VALUE OF ARMY INSTALLATIONS DURING BASE REALIGNMENT AND CLOSURE by MAJ Charles V. Fletcher, 145 pages.

Large portions of recent Army budgets have been allocated for Base Realignment and Closure (BRAC), including more than two billion dollars from 1989 to 1995. These allocations have been made in anticipation of savings in annual operating costs, including an estimated $480 million per year for the BRAC 1995 recommendations alone. These overall savings are critical to a future smaller, modernized, more efficient Army. BRAC economics and decision making are a very complex process, encompassing financial, military, and political considerations. This thesis provides an analysis of how the Army's 1995 determination of military value was performed, and how it contributed to the BRAC process. For historical reference, it also provides a detailed description of the 1995 process, and how that process differed from some of the previous rounds. The analysis provides a critical review with recommendations that will improve the process for future Army BRAC decisions.

ACKNOWLEDGEMENTS

I am grateful to Mr. John Nerger and LTC Kevin NcGuire of the Army Basing Study for their wisdom and patience. They taught me the Army's BRAC process.

Additionally, I thank Professor Robert Dell of the Naval Postgraduate school. He assisted greatly in the writing and editing of this thesis.

LIST OF ABBREVIATIONS

AAA	Army Audit Agency
ACSIM	Assistant Chief of Staff for Installation Management
Admin	Administrative
AMC	Army Material Command
ARNG	Army National Guard
ASIP	Army Installation and Stationing Plan
BRAC	Base Realignment and Closure
COBRA	Cost of Base Realignment Actions
DCSLOG	Deputy Chief of Staff for Logistics
DCSOPS	Deputy Chief of Staff for Operations
DoD	Department of Defense
D-Pad	Decision Pad
ESSD	Engineer Strategic Study Center
FYDP	Future Year Defense Plan
GAO	Government Accounting Agency
HQDA	Headquarters, Department of the Army
HQRLPANS	Headquarters, Real Property Planning System
IA	Installation Assessment
IBOE	Installation and Base Operating Expense
IFS	Installation Facility System
IMA	Information Mission Area
JAAT	Joint Army/Air Force Attack Team
MACOM	Major Army Command

MLRS	Multiple Launch Rocket System
MOUT	Military Operations on Urbanized Terrain
MPRC	Multi-purpose Range Complex
MVA	Military Value Assessment
OSD	Office of the Secretary of Defense
OSUB	Optimally Stationing Units to Bases
PAED	Program Analysis and Evaluation Directorate
RETS	Remote Electronic Target System
SOP	Standard Operating Procedures
TABS	The Army Basing Study
T&E	Test and Evaluation
USAR	U.S. Army Reserve
VHA	Variable Housing Allowance

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CHAPTER 1

INTRODUCTION

The Army's Base Realignment and Closure (BRAC) analysis process for 1991, 1993, and 1995 allowed the Army to close or realign about a quarter of its installations. The General Accounting Office (GAO) viewed this process favorably and called it "logical, consistent and fair."[1] The 1995 Defense Base Realignment and Closure Commission (1995 BRAC Commission) recommended further reductions in base infrastructure. They cited several key points about the last ten years to support their position: the defense budget has declined in real terms by almost 40 percent and the Department of Defense (DoD) has reduced the size of its forces by 40 percent (Army has eliminated 45 percent of its tactical divisions, Air Force has eliminated 44 percent of its tactical fighter wings, and Navy has eliminated 37 percent of its ships). Concurrent with these cuts, DoD reduced the domestic base infrastructure by only 21 percent. One of the 1995 BRAC Commission's recommendations is to have another BRAC round in 2001 similar to the previous rounds.[2] This thesis examines the military value computation of Army installations for future Base Realignment and Closure (BRAC) analysis.

The BRAC process is important because it is the only means the Army has to close or realign major installations.[3] From 1989 to 1995 the Army programmed over two billion dollars in the BRAC program. The net reduction in infrastructure over the same time period was over $15 billion. About 24 percent of the existing

installation structure is scheduled to close or be realigned.[4] The payoff for the Army is reduced operating expenses, with estimated savings of about $480 million per year after implementation of the BRAC 1995 proposals.[5]

The analysis of the military value of installations serves as a primary input to the BRAC process. This analysis provides the Army and the public a means of identifying the installations that provide the most and the least "value". While the Army's process of determining military value has been fairly consistent since 1991, its ability to conduct these analyses has changed dramatically since 1991.

The Army faces another reduction of at least 20,000 active duty soldiers. Secretary of the Army Togo West said, "The Army end strength may slip to 475,000 by the end of the decade."[6] Because further budget cuts and reduction of personnel are likely, the reduction in infrastructure must continue. This thesis provides a detailed description of the Army's 1995 BRAC military value assessment process and offers improvements to the process for future BRAC rounds.

Primary and Secondary Research Questions

This thesis answers the following primary research question: Is the Army's current methodology for computing the military value of installations adequate for use in future BRAC rounds? Secondary research questions are: (1) Is it free of major computational flaws? (Sound?), (2) Is it logically constructed? (Logical?), (3) Is it consistent? (Consistent?), and (4) Is it efficient? (Efficient?)

The secondary questions offer a test of the Army's current methodology in simple terms.

This chapter contains a brief discussion of the history of base closures, which provides a basis for understanding the complicated and politically contrived BRAC environment. It continues with a discussion of how military value fits into the BRAC process. Finally, it discusses the scope, assumptions, and limitations. The rest of the thesis is divided into four chapters. Chapter 2 is a literature review, concentrating on BRAC literature and decision theory. Chapter 3 describes the Army's BRAC 1995 process. Chapter 4 provides an analysis of the BRAC 1995 process for determining the military value of its installations. Chapter 5 summarizes the conclusions and recommendations. Appendix A provides definitions of key terms used throughout the thesis. The first use of each key term found in appendix A is shown in bold.

Background

The History of Base Closures

Early Base Closure Efforts

In the early 1960s, President Kennedy directed the Secretary of Defense to institute a comprehensive program to reduce the DoD's excess base structure remaining after World War II and the Korean War. This resulted in over sixty major bases being closed, making it the largest base closure round in U.S. history. The DoD conducted the analysis for these closures with minimal consultation with the military departments, Congress, or the public.[7]

Congress and the public did not fully anticipate the broad extent of the 1960's closures. The political and economic impact was substantial. Overall, Congress viewed these closures negatively and reacted by increasing the level of interest and participation in all

future base closure announcements.[8] In 1965 Congress passed legislation designed to involve itself in the process. President Johnson vetoed the legislation, causing increased tensions between the executive and legislative branches. Without legislative oversight, the DoD continued closing bases, as needed, throughout the 1960s and early 1970s.[9]

In the early 1970s, Congress began to limit or deny funding for base closures. In 1976, the Military Construction Authorization Bill contained a provision prohibiting any base closure or reduction of more than 250 civilian employees, unless the DoD notified Congress, assessed the personnel and economic impacts, completed the National Environmental Policy Act (NEPA) requirements, and waited nine months. The President again vetoed the bill. The Congress tried to override, but failed.[10]

In 1977, President Carter approved legislation requiring the DoD to notify Congress when a base is a candidate for closure or realignment, to prepare reports on the strategic, environmental, and economic consequences and to wait 60 days for Congress' response. This legislation (Section 2687, Title 10, U.S. Code), combined with the NEPA requirements, made closing a base difficult. In fact, no major bases were closed between 1977 and 1991.[11]

In 1983, the President's Private Sector Survey on Cost Control (The Grace Commission) included a finding that economies could be made in the base structure. The President's Survey recommended a nonpartisan, independent commission be established to study the issues and to submit a list of bases for closure.[12] The DoD did not implement the recommendation to form a commission until 1988.

In 1988, the Secretary of Defense and Congress developed legislation that mitigated some of the problems with the previous BRAC law. The new legislation, Public Law 100-526, required an independent commission, selected by the Secretary of Defense, to provide its closure recommendations to the Secretary and to Congress. The Secretary of Defense and the Congress could accept or reject the list entirely, but not make changes. In addition, Congress had to enact a joint resolution of disapproval to reject the list, but had to do nothing for the closure recommendations to be approved. The new law also allowed the DoD to conduct the extensive NEPA studies after a base was approved for closure.[13]

The Defense Secretary's Commission on BRAC was chartered on 3 May 1988 and consisted of two chairmen and ten commissioners. The Commission recommended 86 installations be closed and predicted savings of $693.6 million annually thereafter.[14] The 1988 study emphasized that the decision to close or realign bases was primarily based on military value, rather than on savings or on economic or environmental issues.[15] Afterward, the term **military value** was commonly associated with the quantitative assessment of an installation's physical **attributes**. The 1988 study grouped attributes under five factors, as shown in table 1.

In January 1990, the Secretary of Defense announced a number of restructuring initiatives, including closure of 36 bases in the United States, the inactivation of seven ammunition plants, and the partial inactivation of two tank plants.[16] Congress challenged this selection and claimed that the list unfairly targeted Democratic districts.

Table 1. The Military Value Attributes used by the DoD during the 1988 Secretary of Defense's Commission on BRAC

FACTOR	PHYSICAL ATTRIBUTES
Mission Suitability	Site-Specific Mission Deployment Means Relationship to Other Activities Weather/Terrain/Land Use Survivability Maneuver Space
Availability of Facilities	Operations Support Infrastructure Administrative
Quality of Facilities	Condition Technology Configuration
Quality of Life	Family Housing Bachelor Housing Recreation/Amenities Medical
Community Support	Work Force Commercial Transport Infrastructure Complementary Industry

(Source: The Defense Secretary's Commission on Base Realignment and Closure, Base Realignments and Closures, Report of the Defense Secretary's Commission (Washington, D.C.: December 1988), F-50.

Before DoD could take any substantive action to close the bases on the 1990 list, Congress enacted the Defense Base Closure and Realignment Act of 1990 (Public Law 101-510), in November 1990.[17] This limited the Secretary's authority to close, or realign major installations.

The Defense Base Closure and Realignment Act of 1990 (The BRAC Act)

The Army, operating under the BRAC Act, has made tremendous strides to eliminate bases no longer needed in the United States and to downsize or streamline others. Approximately one of every five major Army installations in the U.S. is closing or realigning. Below

is a summary of the Army's BRAC actions from 1991 to present.[18] A complete list of Army base closures and realignments within the U.S. is in appendix B.

The 1991 BRAC Commission

In 1991, the nation witnessed a new and open process that governs the proposal, review, and approval of all base closures and realignments in the United States. The BRAC Act brought about this process. An independent presidential commission looked at the information, criteria, and rationale used to arrive at the DoD BRAC recommendations. For the most part, it adopted the Army's proposals for closure of five bases and realignment of six other bases and 17 laboratories. These actions allowed the Army's major commands to begin restructuring efforts, like consolidating research laboratories, creating training warfighting centers, finding a permanent home for the Joint Readiness Training Center, consolidating depots, and reshaping the maneuver-sized installations. The new procedures allowed the Army to reexamine some of the recommendations of the 1988 Commission and make more cost-effective changes.[19]

The 1993 BRAC Commission

The 1993 Commission occurred during an interim period for the Army. The DoD had not decided the final force structure for the Bottoms Up Review (BUR Force). The Army had not developed a stationing strategy for geographic location of forces. It took a cautious approach towards BRAC 1993, which allowed later stationing and reflagging decisions without being constrained by the BRAC process. In BRAC 1993, the Army closed one major installation and realigned four others.[20]

The 1995 BRAC Commission

In the summer of 1994, the Army announced that the end strength would drop from 540,000 to 495,000, and the active divisions would decrease from twelve to ten. The available budget resources had declined from a high of $90 billion a year in the 1980s, to around $60 billion a year in 1996. These conditions motivated the Army to reduce the infrastructure significantly during BRAC 1995. BRAC 1995 was the Army's largest closure round, as it recommended fifteen major bases and over twenty smaller bases for closure.[21]

Overseas BRAC

Reshaping the Army's installations is not limited to the United States. A strategy of forward presence now relies less on forward deployments (and their attendant basing requirements) and more on power projection from the continental United States (CONUS). Force reductions overseas allow the return of Army installations to the host nation. Before Fiscal Year 1991, the Army controlled approximately 1,000 sites, ranging in size from large installations to small unmanned properties, outside the United States. About 850 sites were in Europe. To date, the DoD has announced that 448 Army sites overseas (430 in Europe and 18 in Korea) will return to the host nation, or reduce their operations. More announcements are expected. The current reduction plan in Europe schedules 533 sites for closure, or realignment. Additional reductions in Europe, recently announced by the Secretary of Defense, will increase the number of sites closed, or realigned.[22]

DoD controls the process to close sites; no Congressional approval is required. The BRAC Act of 1991 does not apply to

closures overseas. Because the process is different from the domestic BRAC process, it is not investigated by this thesis.

BRAC and the Army's Decision Process

Downsizing of the DoD caused the Army to seek less costly ways to operate. The Army has reduced force structure, consolidated missions, and streamlined its functions to save money. A decision to reduce total strength necessitates a force structure decision. This in turn necessitates a stationing decision. After the Army decides force structure and stationing priorities, excess facilities are identified and reduced.

The decision processes used to reduce personnel strength, determine force structure, station the force, and close facilities are complicated and interrelated. Eliminating excess facilities is the only step that requires Congressional involvement. Because it does, it is contentious, laden with oversight, and slow. The BRAC process has always lagged behind force structure and stationing decisions.

Military Value in BRAC Analysis

The determination of military value is key to BRAC analysis. By law, BRAC decisions must give priority consideration to military value. The Office of the Secretary of Defense (OSD) provided broad guidance on the development of military value, but the Army determined its own process, methods, and structure.

The Army determined military value using quantitative and qualitative information. The latter is usually provided by comparing a common set of weighted attributes from each installation. This quantitative analysis, called the **Military Value Analysis (MVA)** in

BRAC 1991 and BRAC 1993, and the **Installation Assessment (IA)** in BRAC 1995, provides a baseline for comparisons between similar installations. Because the MVA/IA process is quantitative, every data element, factor, and weight used can be easily verified or disputed. The public, Congress, and the media have questioned data entries and/or disagreed with the quantitative tools used on numerous occasions.

The Army leadership provides a qualitative assessment of the strategic value and uniqueness of installations to support the Army's role in the National Military Strategy. This assessment, based on years of experience, visits to installations, and personal judgment, is named the **Army stationing strategy**. It provides operational requirements, stationing requirements, and an operational blueprint for each category of installations.[23] Because it is a qualitative assessment, it is much harder for personnel outside the Army to question.

The combination of the quantitative and qualitative assessments determines the military value of an installation. Currently, the Army recognizes only two values for military value: high and low. The Army only studies installations with low military value for closure. In addition to military value, the Army considers the other four selection criteria (fiscal impact, economic impact, community impact, and environmental impact) before determining which installations to close or realign.

Scope

The thesis questions provide a way of orienting the research in a specific, narrow direction. It considers the Army's current military value methodology and will answer the following primary research question: Is the Army's current methodology for computing the military value of installations adequate for use in future BRAC rounds?

In this question, the "current methodology" is that used in the BRAC 1995 round of base closures. The analysis determines whether it is "adequate" for future use. This thesis defines "adequate" as free of major computational flaws, logically constructed, consistent, and efficient.

The secondary research questions form the basis for the methodology and are derived the primary research question. These offer a test of the Army's current methodology in simple terms. In short, is the Army properly constructing and analyzing the problem?

Importance

This thesis investigates the Army's military value calculations in previous BRAC processes to determine what changes are needed for future BRAC analyses. It provides a reference on the complicated interrelationships of the BRAC military value process.

Each round of base closures generated a different team of personnel to develop the process, collect and evaluate quantitative data, develop analytical tools, establish standard operating procedures (SOPs), analyze the data, interface with qualitative assessments, and present the analysis to the top leadership of the Army. The Army learned many hard lessons during the three BRAC rounds, at great cost in terms of time and manpower. The individuals

comprising the Army's BRAC teams have been transferred to other duties and are retiring. A single source document, such as this thesis, can eliminate some trial and error during the next round of infrastructure reductions.

The Secretary of the Army noted the critical nature of BRAC during a speech at the Command and General Staff School. In his speech, Secretary Togo West said that the Army would apply all BRAC savings to the Army's modernization programs.[24] Without BRAC savings, the Army will not be able to modernize as effectively.

Assumptions

The key assumption of this thesis is that a similar process is needed in the future to select installations for closure. This provides the primary reason for the thesis: to determine if Army's BRAC military value process needs to be modified prior to the next base closure round. To test this, an assumption is made that the Army's BRAC 1995 military value process is adequate for future base closure analysis. Other assumptions are:

1. The installations obviously low in military value closed during the last rounds of BRAC. The remaining installations all have significant reasons for remaining open. The differences between the values of installations remaining are very narrow, requiring increased resolution in future BRAC analyses.

2. The future BRAC process will remain similar to the previous BRAC 1995 process. If legislation is passed that significantly changes the BRAC process, this analysis of past BRAC efforts may not be helpful.

3. The commercial analytical tools available for quantitative and qualitative analysis will continue to improve.

Limitations

1. The 1988 and 1989 BRAC rounds (BRAC I and BRAC II) are used to provide historical context, but are not included in the process review.

2. Because the process to close and realign bases overseas (BRAC III) is not controlled under the BRAC Act, it will not be analyzed. The overseas base closures were conducted entirely within the DoD and were not subject to Congressional approval.

3. The results of the BRAC process, although of interest, are not the primary aspect to be analyzed.

4. The analysis performed by other Services under the BRAC Act will not be investigated. Other Services' methods and processes are described only when it is appropriate for contrast.

CHAPTER 2

LITERATURE REVIEW

The literature review concentrates on two areas: BRAC processes and general decision theory. The first reviews literature related to the BRAC process and the calculation of military value. Although there are numerous articles concerning the results and impact of BRAC actions, most are not useful to this study. Very few describe or comment on the military value process in an objective manner. The announcement of each base closure list generated a flurry of activity at local newspapers, producing articles mostly suspicious of the process with limited research. Consequently, most of the evidence used in this thesis comes from various DoD agencies.

The second section of this chapter reviews textbooks concerning general decision theory. It is valuable to provide comparisons between theory in decision-making and the military value analysis process.

Key Works on the BRAC Process

The public did not have access to the Army's military value analysis for each BRAC round, until the release of recommendations. The Total Army Basing Study (TABS), the Army Audit Agency (AAA), and the General Accounting Office (GAO) provide the largest volume of information on the process. These agencies had direct access to the process during the conduct of the analysis.

Army Reports

A major source of documentation for a review of the BRAC process is the reports prepared by the Army and forwarded to the DoD at the conclusion of each round. These describe the installations recommended by the Army for closure, or realignment, and the process used to select them. Each round produced a separate report: (1) *Base Closure and Realignment Recommendations: Detailed Analysis* was the BRAC 1991 final report, with five annexes; (2) *Report to the Base Closure and Realignment Commission: Volume III (Department of the Army Analyses and Recommendations)* was the BRAC 1993 final report, with three reference volumes; and (3) *DoD Base Closure and Realignment Report, Volume III: Department of the Army Analysis and Recommendations* was the BRAC 1995 final report, with three reference volumes.

These reports received varied distribution mostly within the Army. All are a matter of public record. They also contained various annexes and reference volumes with backup data and narrative.

The BRAC 1995 final report provides the latest information on the analysis of military value and provides the results of the military value analysis for BRAC 1995. Within this report, the stationing strategy, the operational requirements, and the operational blueprint (all qualitative assessments) are described. The Army's BRAC 1995 Reference Volume II, Installation Assessments, describes the Army's methodology for conducting the quantitative measurement of military value.

Although the process is described in Army reports, they were written for oversight agencies and the public, without

self-criticism. They describe how the Army decided to conduct the process. Flaws and difficulties are not mentioned. Additionally, they were produced in a constrained time frame, so some editing problems exist, especially in the supporting volumes. Finally, they do not address the future of the BRAC process and do not make recommendations for improving the military value process.

Army Standard Operating Procedures (SOPs)

During each BRAC round, standards were published for data entry, analysis, and documentation. These describe what the Army established as the baseline analytical structure for the BRAC process. As such, they form a basis for understanding the procedures used and the changes between and during BRAC rounds. Many changes, some posted and some not posted, occurred to the analytical procedures during the BRAC analysis and between BRAC rounds.

The Army's SOPs do not address the rationale for using particular analytical procedures, nor the future of the BRAC process. Because analysts used these SOPs to provide uniform analysis within the Army, the SOPs did not always incorporate changes proposed or required by agencies outside of the Army (DoD and the Commission). Once the Army report was written, the SOPs were put aside. They were not reviewed, nor updated after the BRAC analysis was complete. In most cases, they were not packaged for publication; they were passed out as memorandums, training notes, and meeting notes.

This thesis will suggest what type of SOPs are critical to the process, and what key elements they must contain. It recommends how they could be written and used at DoD and Commission level.

Audit Reports

GAO Reports

The BRAC Act requires the GAO to conduct a detailed analysis of the Secretary of Defense's recommendations and selection process after each round of closures. The analysis results in a report forwarded to Congress, usually about thirty days after the DoD announces the list of installations closing and realigning. There is one main report on each BRAC round from the GAO that covers all the DoD recommendations. The report from BRAC 1991 is called *Report to the Congress and the Chairman, Defense Base Closure and Realignment Commission: Military Bases, Analysis of DOD's Recommendations and Selection Process for Closures and Realignments, April 1991.* The report for BRAC 1993 is numbered GAO/NSIAD-93-173 and titled *Report to the Congress and the Chairman, Defense Base Closure and Realignment Commission: Military Bases, Analysis of DOD's Recommendations and Selection Process for Closures and Realignments, April 1993.* The report for BRAC 1995 is: *Report to the Congress and the Chairman, Defense Base Closure and Realignment Commission: Military Bases, Analysis of DOD's Recommendations and Selection Process for Closures and Realignments, April 1995.*

The GAO analysis is concerned mainly with the process used to produce the list of closures and realignments. Auditors begin the audit about six months before the list is released. They observe how each Military department establishes procedures and controls the analysis for military value computations, cost analysis, and capacity analysis. The GAO reviewed the guidance produced by the DoD in base closure policy letters, then observed how the military departments executed it. Key DoD guidance includes: criteria for military

value, procedures for cost analysis, categorization of installations, and the base closure selection criteria. The GAO also reviewed, in detail, closure recommendations that appeared inconsistent with the process.

The audit reports provide an excellent source of how an independent agency perceived the BRAC process. They are widely read and distributed throughout the Congress, the press, and the public. They became known as the "report card" for each military department and the DoD. In many cases, an unfavorable comment in the GAO report was the impetus for changing the process. Additionally, a favorable comment in the GAO reports provided a strong rationale for not changing the process. The Army had favorable reports from GAO for BRAC 1991, 1993 and 1995. The BRAC 1995 GAO report states:

> The Army completed its BRAC 1995 review using basically the same process it had used in prior BRAC rounds. The Army's process for recommending installations for closure and realignment generally complied with legislation and OSD policy guidance, was well documented, was supported by generally accurate data, and appeared reasonable.[25]

In the GAO's BRAC 1995 report, the Army's military value determination is questioned for two categories of installations. The report states: "The Army did not fully adhere to its regular process for installations in assessing military value when recommending minor sites and leased facilities for closure."[26] The Army's response to the GAO was: the BRAC Act does not require the Army to use the same process for every recommendation, as long as it addresses each selection criterion and is consistent within the category.

In the assessment of leased facilities and minor sites, the Army considered each selection criteria and provided consistent analysis within each category. Due to the unique considerations when

assessing leased facilities and minor sites, the Army varied from their standard process.

The GAO audit reports provide a good overview of the BRAC process, but only limited detail about the military value calculations, and they do not record small problems and flaws in the process. They do not evaluate the computer models used or assumptions made when computing military value. They do not make specific recommendations unless a problem would cause a major error (e.g., an installation to be recommended for closure, or realignment in error). In the Army's case, the GAO has cited several cases where there were questions or concerns about the recommendations. In BRAC 1993, they questioned why the Army did not close Fort Monroe, Virgina.[27] In BRAC 1995, they questioned why the Army wanted to close Fort McClellan, when its closure had been rejected by two previous commissions. Also in BRAC 1995, they raised concerns about some of the data used in the military value analysis of ammunition storage installations and about the recommendation to realign Letterkenny Army Depot.[28]

Because the GAO was the only independent agency that had free access to all the different Military departments' BRAC analysis cells, this thesis relies heavily on their reports to begin the overall assessment of the Army's process. The GAO review provides excellent insight into how the Navy and the Air Force conducted the same analysis. All three military departments were provided the same guidance from the OSD for the conduct of military value calculations, but each department chose a different methodology to accomplish the analysis. The methods used by the Navy and Air Force to develop

military value are presented briefly when needed to provide a contrast to that of the Army during the analysis chapter.

Army Audit Agency Reports

Army Audit Agency (AAA) provided continuous audit oversight for data collection, modeling, and other procedures conducted at TABS. During BRAC 1995, AAA published over 70 reports dealing with BRAC issues and helped ensure TABS had the most accurate data possible. AAA audited TABS's data calls and reviewed how each agency reported data back.

The AAA provided the Army a statistical review of the data provided for the installation assessment data call. They looked at the effect of certain errors on the overall installation assessment rankings.

DoD Policy Letters

The DoD is the starting point for all BRAC guidance. They are in charge of conducting the analysis and supplying the consolidated recommendations to the president's commission. Although it may seem that each military department was free to conduct their analyses as they chose, the DoD did provide some uniform guidance and direction. This initial is found in a memorandum titled "1995 Base Realignment and Closures (BRAC95) Policy, Procedures, Authorities and Responsibilities," dated 7 January 1994.[29]

This document identifies several important guidelines for the conduct of military value analysis. Most importantly, the definition of military value is given as part of the DoD selection. Additionally, the guidance specifies:

1. All installations must be treated equally with regard to the analysis.

2. All recommendations must be linked to the force structure.

3. Each Military department must keep accurate records of their policies, analysis, and recommendations.

4. Each Military departments must establish internal controls and provide uniform guidance.

5. Each Military department must have in place systems for verifying the accuracy of all data used by all levels of command.

6. Each Military department must develop one or more measures/factors (attributes) for application to the final criteria for base structure analysis.

7. Installations must be grouped into categories with like missions, capabilities, or attributes for comparison to the forces structure plan.

DoD provided a total of six policy memoranda throughout the BRAC process. These are included in the *DoD Base Closure and Realignment Report, March 1995,* as appendix C.

DoD Reports

The DoD published one final report for each BRAC round. These were titled *DoD Base Closure and Realignment Reports.* These final reports contain the base closure law, DoD policy guidance, and a description of each closure and realignment recommendation. These reports are an executive summary of the recommendations and provide a brief summary of the selection process for each DoD component providing recommendations. They provide a good overview of the

process but lack detailed information on military value assessment process.

BRAC Commission Reports

The Commission reports are the final documents published on BRAC recommendations, they list all the recommendations proposed by the DoD, and then whether each recommendation is accepted, modified, or rejected. The Commission reports do not go into great detail concerning why the recommendation was accepted or rejected, nor do the reports provide valuable insight into the military value process. they provide a good summary of the final BRAC decisions, with a limited rationale for each Commission decision. The Commission reports were titled *Defense Base Closure and Realignment Commission 1991/3/5 Report to the President*.

News Media

Much information was published by the news media throughout the BRAC rounds. Local newspapers highlighted the local base or installation under study. In most cases the news media sensationalized the process and supported attempts to keep local installations open. This source provides a great volume of information, but is the least objective and the least reliable. For this thesis, local press coverage is not included as source material.

Research Papers

Several notable research papers and theses have been published in this field. In 1991, the Army contracted the Engineer Strategic Study Center (ESSC) to complete a comprehensive review of the BRAC military value process used in the 1991 round. The ESSC

published *Review of the Army's Installation Assessment Methodology*. This work is a good source of information and analysis on the attributes, installation categories, weights, and decision model used in the BRAC 1991 process. It provides an independent assessment of the Decision Pad (D-Pad) model used by the Army during BRAC 1991, BRAC 1993, and BRAC 1995. It also provides recommendations on some of the qualitative aspects of the Army's process: the categories chosen, the attributes and the attribute definitions.

D-Pad is a commercially produced decision analysis software model. It uses a decision analysis system called multiple attribute decision-making to assist the user in making complex decisions involving numerous alternatives. It is a weighted decision matrix program. The user enters the attributes, scales, weights, and the raw scores. The model adjusts the raw values based on the scale selected by the user (i.e., a higher value is a better score). Then it applies the weight to the scaled raw value and computes the outcome. The output is a spreadsheet that displays the attribute name, the weight applied, the scores, and the rank of each installation compared to the other installations within the category. The Army used the D-Pad model to conduct the MVA for BRAC 1991 and BRAC 1993, and for the IA in BRAC 1995.

The ESSC assessment compared D-Pad to several other available multiple criteria decision models. The report concluded that the it was adequate for the analysis and superior to the other choices.

In 1990, a research effort began at the Naval Postgraduate School in Monterey, California. This provided several interesting works in the field of BRAC analysis, beginning with a bi-criteria optimization model - - Optimally Stationing Units to Bases (OSUB).

The OSUB model was first introduced in a master's thesis by Greg Singleton: *Stationing United States Army Units to Bases: A Bi-Criteria Mixed Integer Programming Approach*. A technical report, *Modeling Army Maneuver and Training Base Realignment and Closure* by Professor Robert Dell and others, used the OSUB model to optimally station a mechanized brigade to a United States installation.[30] This model used military value, capacity, and cost considerations to optimize the set of installations retained by the Army. OSUB used a fixed value for each installation, obtained by combining the deviation in requirements for ranges and maneuver acres with several Army BRAC 1993 attributes: reserve component support, information mission area, health care index, and environmental factors.[31] The OSUB model considers the military value of each installation as a contribution to one of the objective functions.

Further research by the Naval Postgraduate School has produced a model to optimize the closure of Army Material Command (AMC) installations -- *Modeling Closure of Army Material Command Installations: A Bi-Criteria Mixed Integer Programming Approach* by William Tarintino. Additional research has produced models that optimize the use of training land -- *Evaluating Army Bases' Ability to Support Maneuver Training: A Linear Programming Approach* by Wes Gillman, and that optimize the schedule of funding for base closure actions, *An Optimization Model for Scheduling Army Base Realignment and Closure Actions* by Eddy Free. These research efforts began from the initial study of how to optimally select bases for closure.

Optimization models can provide support to the selection of bases for closure; however, this thesis does not study the use of

optimization models as a methodology to produce military value assessments.

Key Works in Decision Theory

In the past several decades, a large body of material, written by economists, mathematicians, statisticians, social scientists, and behavioral scientists has been published on the subjects of decision theory and value theory.[32] *Applied Decision Analysis* by Derek W. Bunn provides a good source of techniques and methodologies for decision-making. An excerpt from the text shows how it might be of value to this thesis.

> *Applied Decision Analysis* takes a practical perspective in the study of techniques to aid decision makers faced with complex problems. It emphasizes the decomposition of large problems into more manageable elements and the personal relationship of the decision maker to the decision model.[33]

This source provides information on the nature of decision analysis and on decision-making methodologies. The basic structure presented *in Applied Decision Analysis* involves three principal phases: finding occasions for making decisions, finding possible courses of action, and choosing among the courses of action.

In general, two approaches exist in decision theory. Operation research, statistics, and mathematics practitioners advocate hard science solutions like optimization, simulation, and statistical testing. Management and business decision makers on the other hand often make allowances for qualitative data and the decision maker within the decision system.

As an example of the hard science approach, James E. Shamblin in *Operations Research: A Fundamental Approach* gives the decision-making steps as:

1. Formulation of the Problem
2. Construction of a Model
3. Derivation of a Solution
4. Testing of the Model and Solution
5. Establishment of Controls Over the System
6. Implementation of the Solution.[34]

This methodology assumes that a model (computer model) is required for decision-making analysis. The methodology (assuming the model is developed by someone other than the decision maker) does not provide a specific place or a specific step for the decision maker to interact.

In contrast to the steps above, a management approach provided by Robert Behn in *Quick Analysis for Busy Decision Makers* is: "THINK!, DECOMPOSE!, SIMPLIFY!, SPECIFY!, RETHINK!"[35] This type of construction clearly allows the decision maker to get into the process, it makes no mention of a computer model, and it does not even specify that a solution will be reached.

This contradiction in styles makes it very difficult to determine if a decision analysis process is properly structured. Most decisions analysis structures (appropriately) fall somewhere between the two extremes.

A source that provides a clear and systematic structure to the decision-making process is proposed by Donald G. Newman in *Engineering Economic Analysis*. Newman describes decision-making as having eight elements:

1. Recognition of the problem;
2. Definition of the goal or objective;
3. Assembly of the relevant data;

4. Identification of feasible alternatives;

5. Selection of the criteria for judging which is the best alternative;

6. Construction of the interrelationships between the objective, alternatives, data, and the outcome;

7. Prediction of the outcomes for each alternative; and

8. Choice of the best alternative to achieve the objective.[35]

Within this framework, each element can be investigated separately and evaluated for adequacy. A comparable business approach that fits the Army's BRAC military value analysis is provided by Anderson, Sweeny, and Williams in *Quantitative Methods for Business*. The approach, as shown in figure 1, allows the decision maker/manager to have input equal to the quantitative input.

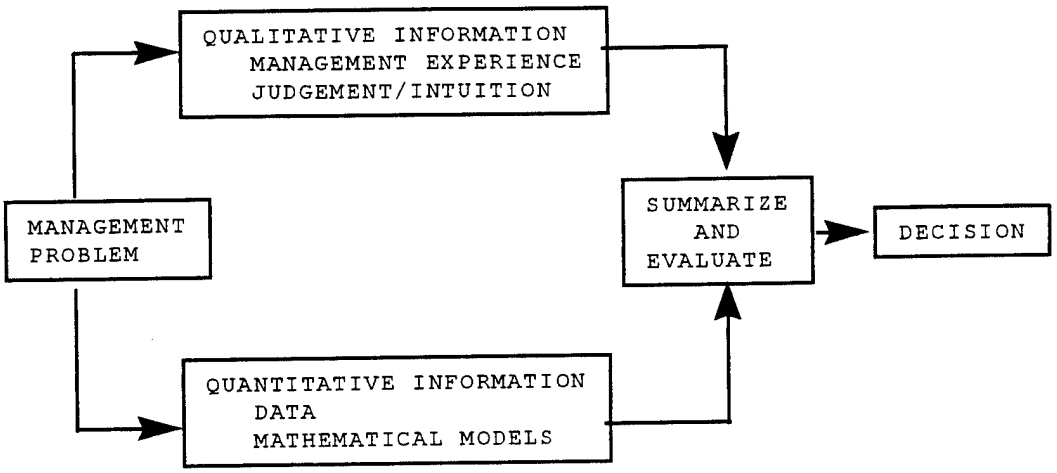

Figure 1. Decision-making Approach using Qualitative and Quantitative Input. (Source: David R. Anderson, Dennis J. Sweeney and Thomas A. Williams, Quantitative Methods for Business (St. Paul, MN: West Publishing Company, 1978), 2.)

Evaluating a complicated decision process like the Army's military value process is just as complicated as deriving the process. The ideas set forth in both management and technical decision-making theories have applicability in evaluating the Army's BRAC military value process. BRAC decisions have vast quantities of data, potentials for modeling, and optimal solutions for cost and savings; but they also have political leaders and managers who fear conflict.

The Army's BRAC 1995 military value process contained both qualitative and quantitative analysis. The balance between these needs to be precise to avoid conflict in future BRAC analysis.

CHAPTER 3

THE ARMY'S BRAC 1995 PROCESS

Introduction

This chapter provides a description of the Army's BRAC 1995 process and shows how the military value analysis fits into the overall BRAC process. It contains three sections: an introduction, a section on the BRAC 1995 military value process, and one on the rest of the BRAC process.

A way to decompose the BRAC process is to use the eight DoD selection criteria. The first four criteria measure military value, and the measurement of these criteria is the military value analysis process. The last four criteria are fiscal analysis (costs and savings impacts), economic impact on communities, the communities' ability to support the recommendation, and the environmental analysis. These criteria serve as a guide to the feasibility of the proposed closure, or realignment scenario. In some cases, they shape the recommendation. Analysis of the final four criteria occurs only after the decision has been made to study the installation for closure. Figure 2, a diagram of the Army's BRAC 1995 process, shows how military value fits into the overall plan for deciding which installations to close or realign.

The Army began preparation for BRAC 1995 in late 1993 by conducting a review of all past and ongoing BRAC actions.[37]

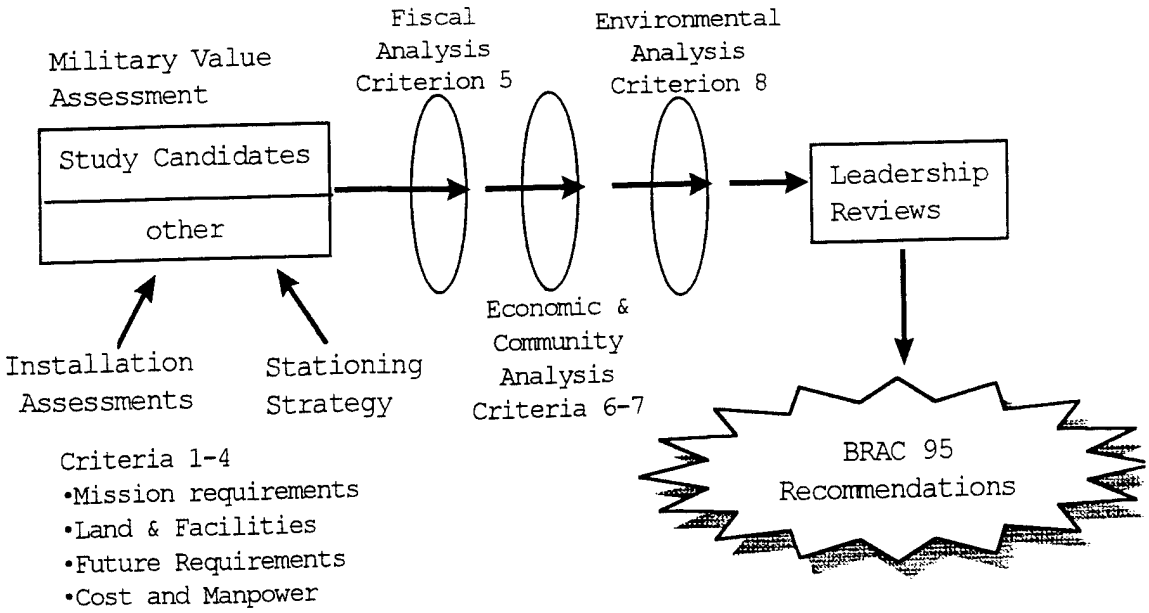

Figure 2. The Army's BRAC 1995 Process. (Source: U.S. Department of Defense, Report to the Base Closure and Realignment Commission: Volume III - Department of the Army Analyses and Recommendations (Washington, D.C.: April 1995), 11.

During the spring of 1994, the Army initiated the Installation Assessment (IA) using data provided by the MACOMs. During the summer of 1994, the Army completed the Army stationing strategy and finalized the military value assessment for each installation. The Secretary of the Army approved a list of installations low in military value as study candidates in August 1994. After the study candidates were selected, the military value assessment was complete.

For each realignment or closure candidate, several alternatives were developed to investigate how the installation could be closed, or realigned. The MACOMs and the Army staff developed the alternatives, and each underwent a cycle of analysis and refinement based upon feasibility, affordability, and economic and environmental impacts.[38] The Army leadership reviewed this initial analysis in the

Fall of 1994, and based on this review, some alternatives were eliminated. The final analysis continued to refine the remaining alternatives until December 1994, when the Secretary of the Army decided which bases would close or realign. Figure 3 shows the time lines for the BRAC 1995 process.

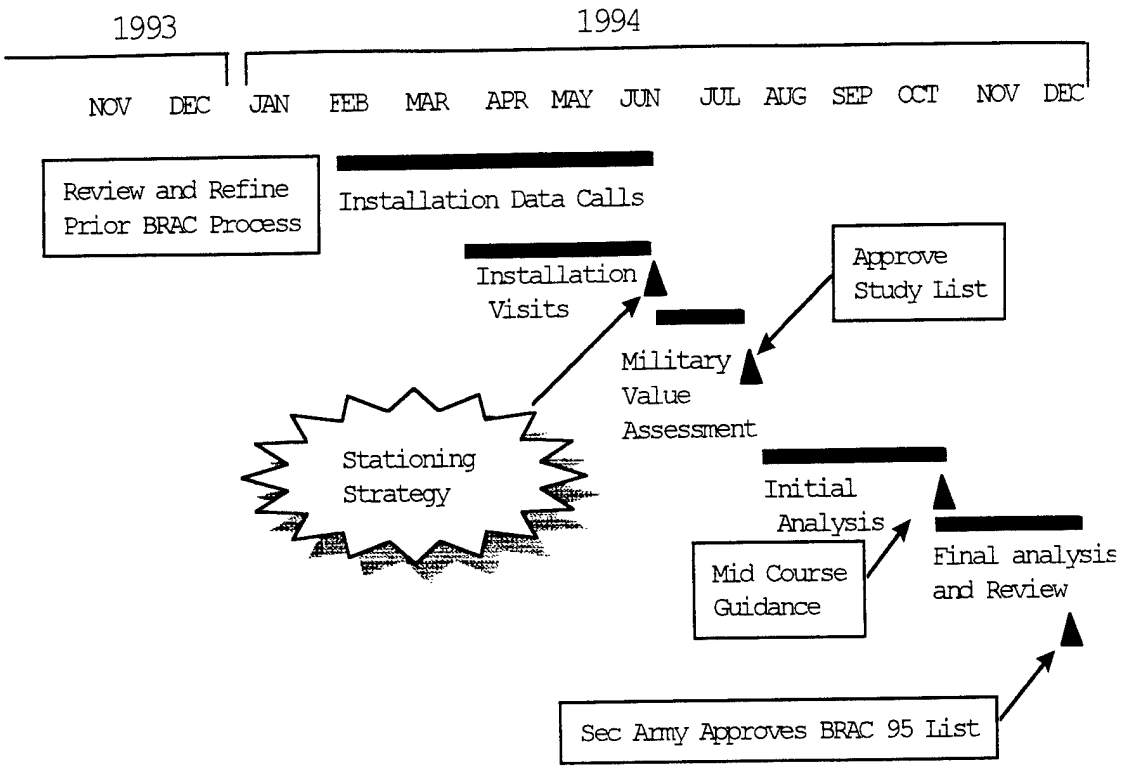

Figure 3. The Army's BRAC 1995 Time Lines. (Source: U.S. Department of Defense, Report to the Base Closure and Realignment Commission: Volume III - Department of the Army Analyses and Recommendations (Washington, D.C:, April 1995), 8.

BRAC 1995 Military Value Process

The Army's BRAC 1995 military value assessment contained two parts: the IA and the Army stationing strategy. The former is an evaluation of installations in quantitative terms, using measures

derived from announced DoD selection criteria. It is similar to the MVA in previous BRAC analysis.

The stationing strategy is a qualitative capacity analysis together with operational insights and military judgments from the senior Army leaders. It was used to develop operational requirements within each installation category. The operational requirements were then formulated into an operational blueprint, a list of the qualitative factors affecting the installations within a certain category. These factors often dictated which installations could be studied for closure or for realignment based on operational needs and current capacity. The operational requirements were the dominant characteristic of the military value assessment. An operational requirement can save an installation from closure or realignment.

The IA and the stationing strategy produced the military value. The Army combined these by ranking installations during the IA, then evaluating the ranked list using the operational blueprint. Installations of low military value were identified by low quantitative scores in the IA or by not being operationally required.

Once the military value was decided, the Army studied low value installations for closure or realignment. Using this strategy, the Army was able to study installations that had high quantitative scores in the IA, but were not operationally required. The Army excluded from study installations that were operationally required. Two examples illustrate how the military value was decided from the IA and the stationing strategy.

First, the Army leadership (in the Army stationing strategy) decided that there was an operational need to maintain the unique characteristics of the four professional institutions: the U.S.

Military Academy, the Army War College, the Command and General Staff College, and the National Defense University. Because of the perceived need to maintain these unique institutions, the Army decided not to study any of the professional schools for closure or realignment. Figure 4 shows how the IA and stationing strategy were combined to produce the military value for professional schools.

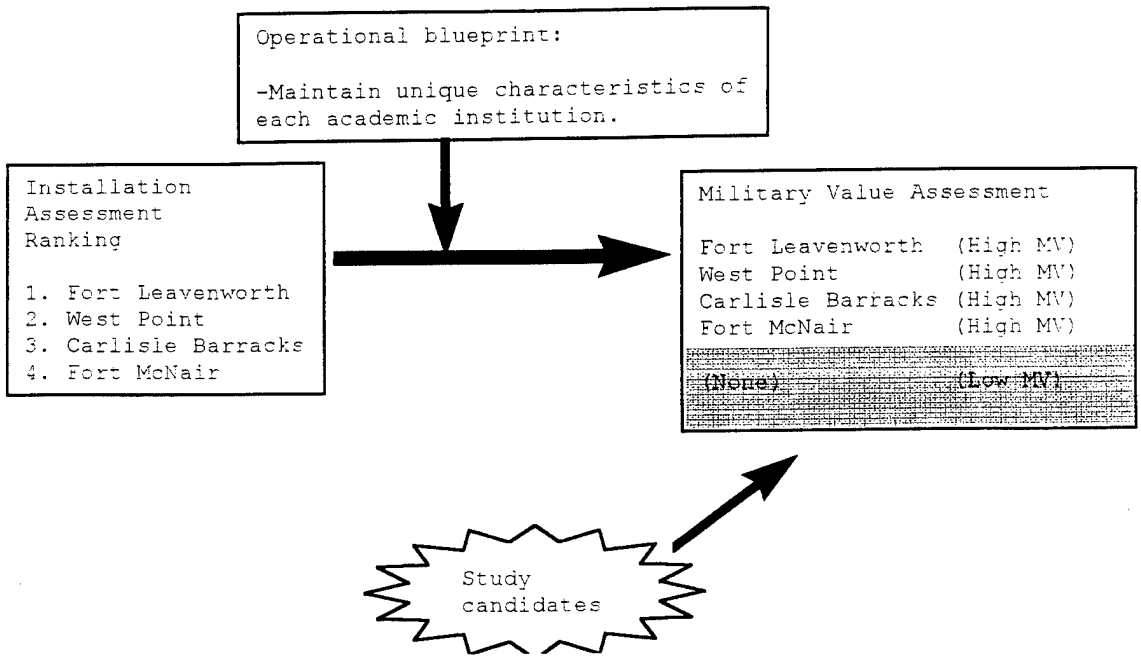

Figure 4. Computation of Military Value Using the Installation Assessment and the Operational Blueprint for Professional Schools. (Source: U.S. Department of Defense, Report to the Base Closure and Realignment Commission: Volume III - Department of the Army Analyses and Recommendations (Washington, D.C.: April 1995), 50.)

Second, in the ports category, because the capacity to conduct port operations exists at numerous civilian ports, the Army did not need to operate its own ports. The operational blueprint was to eliminate ports where there was sufficient capacity to meet Army

requirements. An example of the IA and operational blueprint combination for ports is shown in figure 5.

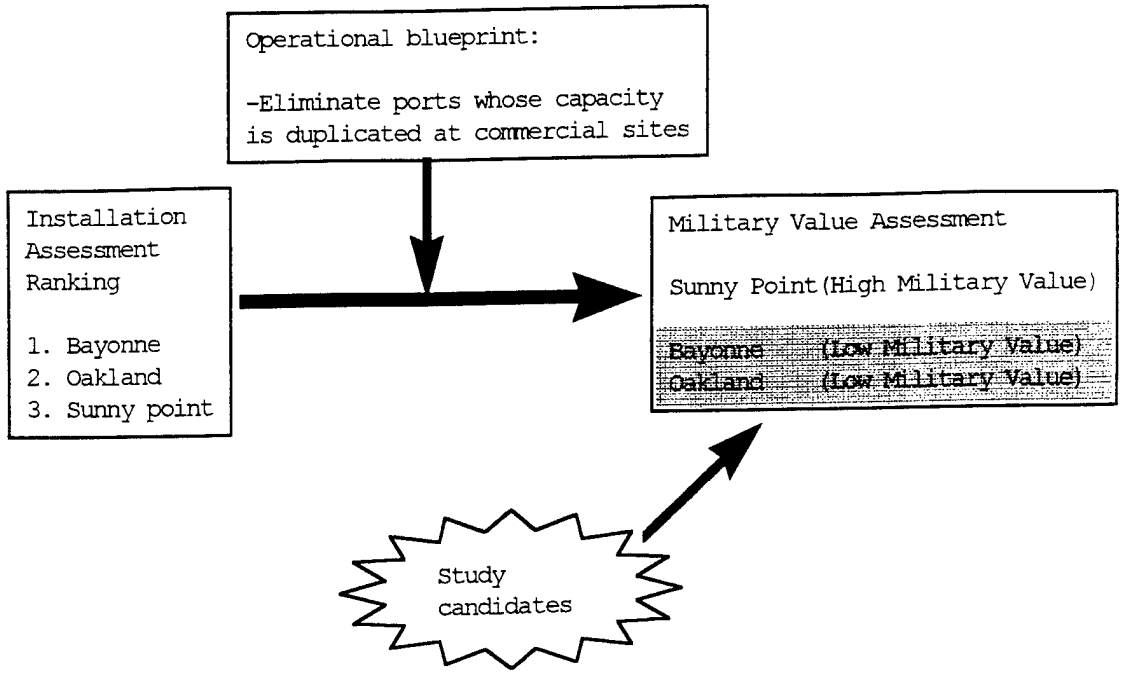

Figure 5. Computation of Military Value Using the Installation Assessment and the Operational Blueprint for Ports. (Source: U.S. Department of Defense, Report to the Base Closure and Realignment Commission: Volume III - Department of the Army Analyses and Recommendations (Washington, D.C.: April 1995), 69.)

The Army conducted the military value analysis of all other categories of installations in the same manners, except for leased installations and minor sites.[39]

Army Installation Assessment Process

In each BRAC round, the Army determined the military value of its installations and improved the evaluation process. In BRAC 1991 and BRAC 1993, the Army undertook a Military Value Assessment (MVA) program, comparing similar installations using only quantitative information. Each MVA produced a ranking of installations using the

D-Pad computer model. In BRAC 1995, the Army used the D-Pad model to conduct the installation assessment.

The Army developed a list of installations to assess based on the BRAC threshold. This list was then decomposed into categories for analysis. A list of the installations studied in BRAC 1995 with their categories is at appendix C. Next, the Army developed measurable characteristics called attributes that relate to the DoD selection criteria. These attributes enable comparisons among installations, are measurable, and help provide an overall depiction of an installation's ability to support the future Army. A description of each attribute and how it was measured is included in appendix D. The attributes have weights to indicate relative importance within the selection criteria. A table of the weights used for each attribute is at appendix E. For example, since mechanized maneuver space is a more important aspect of mission requirements in the maneuver installation category than the amount of supply/storage facilities, maneuver acres was given more weight.

Generally speaking, installations that received favorable assessments are large, economical to operate, and modern. For example, posts with relatively large populations, multiple activities and missions, low operating costs, and a high percentage of permanent facilities fare better in the rankings than single mission posts with fewer facilities.

Conduct of the BRAC 1995 Installation Assessment

To conduct BRAC analysis, the Army established The Army Basing Study (TABS). This study group conducted numerous missions, among them:

1. Refine the analytical process and decision support tools used in BRAC 1993.
2. Conduct a comprehensive, detailed military value assessment of CONUS Army installations in concert with other Army staff agencies, the Major Army Commands, and the Army Audit Agency as part of an overall effort to improve the Army's facilities data base.
3. Initiate, monitor and report on any independent studies and research conducted to address unresolved issues from BRAC 1993 or to prepare for BRAC 1995.[40]

The Army's vision of military value assessment is supplied by several sources: Volume II of the Army's final report, titled Installation Assessments gives this description:

> This quantitative assessment provides a starting point in the evaluation of the Army's base structure. It does not produce a decision on which base should close or realign. Although the assessment offers a logical basis for judging possible opportunities for closure and realignment, it is just one element in the Army's overall evaluation.[41]

Another source on the Army's purpose for the IA comes from the memorandum sent to each MACOM requesting data for the IA:

> The BRAC 1995 IA Program is designed to provide the senior Army leadership a measure of the relative value of installations and facilities used by Army organizations. This memorandum addresses the Army's primary quantitative installation evaluation [formerly called the "Military Value Assessment"].[42]

TABS was the proponent office for the IA program. The following steps provide an outline of the BRAC 1995 IA process: identify candidate installations, categorize installations, develop attributes, assign weights, collect data, input data to the D-Pad Model, and assess the results.

Following is a detailed description of the steps used by the Army to conduct the Installation Assessment.

Identify Installations

The Army used the definition of "military installation" as specified by the Defense Base Closure and Realignment Act:

> The term military installation means a base, camp, post, station, yard, center, homeport facility for any ship, or other activity under the jurisdiction of the DoD, including any leased facility. Such term does not include any facility used primarily for civil works, rivers and harbors projects, flood control, or other projects not under the primary jurisdiction or control of the DoD.[43]

To comply with this guidance, the Army obtained a list of all active installations in September 1994 from the Office of the Assistant Chief of Staff for Installation Management (ACSIM). This office maintains the data base for real property inventory. The list of real property was broken into three groups: property with active unit(s), Reserve Component installations, and other. A review indicated that 75 installations have more than 300 full-time, permanent civilian positions authorized. To ensure a broad and comprehensive review, the Army considered the remaining installations as well [those having fewer than 300 full-time, permanent civilian positions]. After several installations were aligned with their parent installations for purposes of analysis and others were excluded because they are being closed, there were 20 below-threshold installations.[44] The number of installations studied was 96.

The Army National Guard (ARNG) operates numerous installations. However, there are no ARNG properties that meet the thresholds described above. TABS reviewed all leased, licensed, and executive-ordered property used by the ARNG, a total of 56 properties. TABS, in conjunction with the ARNG, reviewed all properties to determine whether it was possible to close them or consolidate them onto active installations.

The U.S. Army Reserve (USAR) has two installations with over 300 civilian employees: Fort Hunter-Liggett and Fort McCoy. They were included among the 96 installations examined by TABS.

Furthermore, TABS, in conjunction with the USAR, examined all properties located within 50 miles of the list of study candidates. The USAR follows established procedures (Army regulation 405-90) to dispose of excess property below the BRAC thresholds.

The OSD policy memorandum number one stipulates that DoD activities located in leased space are subject to the BRAC Act. Initially TABS examined all leases, above and below the threshold. For operational reasons, TABS excluded unique port facilities, recruiting centers, military enlistment processing centers, Corps of Engineers offices, and leases controlled by installations. TABS screened the remaining installations for those costing over $200,000 annually, a reporting threshold established by Congress. TABS identified fifteen leases for study.

The Army also studied twenty minor sites for closure. These were installations below the BRAC thresholds for personnel strength. The Army studied these sites for closure as part of a comprehensive review of infrastructure.

Categorize Installations

The Army used fifteen categories to compare installations in BRAC 1995. These categories are groups of installations with similar missions, capabilities and characteristics. The BRAC 1995 categories were generally similar to previous ones used in BRAC analysis, with a few exceptions. The 15 installation categories for BRAC 1995 are: (1) Maneuver, (2) Major Training Areas, (3) Command and Control/Administrative Support, (4) Training Schools, (5) Professional Schools, (6) Ammunition Production, (7) Ammunition Storage, (8) Commodity, (9) Ports, (10) Depots, (11) Proving Grounds,

(12) Medical Centers, (13) Industrial Facilities, (14) Leased Facilities, and (15) Minor sites.

Minor refinements to BRAC 1993 categories were made after review by and coordination with Army staff offices and MACOMs.

Changes to the BRAC 1993 installation categories are listed below:

1. Command and Control was renamed Command and Control/Administrative Support Installations.

2. Initial Entry Training and Branch Schools was renamed Training Schools.

3. Production Installations was broken into Ammunition Production and Industrial Installations.

4. Depot Installations was limited to maintenance depots.

5. Ammunition Storage was created.[45]

The final installation categories were approved by the Under Secretary of the Army and the Vice Chief of Staff of the Army.

Develop Attributes and Assign Weights

For BRAC 1995, the Army developed attributes that directly support the quantitative measurement of the first four DoD selection Criteria. The Army deleted the measures of merit used in BRAC 1991 and BRAC 1993. In BRAC 1995, the attributes were aligned directly with the DoD selection criteria.

Because the Army deleted the measures of merit, many attributes collected to calculate these were also deleted. For example, "Quality of Life" is not addressed in the DoD selection criteria, so the Army deleted attributes that measured quality of

life. The Army also began a trend in BRAC 1995 to measure the "Cost and Manpower" selection criteria consistently across all categories of installations. The justification was that all installations had the same measurements of cost and manpower.

The Department of the Army staff coordination process was key in the development of a systematic approach to refining the BRAC 1993 attributes. A cross-section of experts from the Army staff and the MACOMs reviewed the attributes. Staff proponents helped the decision makers by research and investigation. The Under Secretary of the Army and the Vice Chief of Staff, Army, approved the final list of attributes.

The study team formed to review attributes and weights consisted of staff representatives from key directorates in the Deputy Chief of Staff for Operations and Plans (DCSOPS), and selected staff from the Deputy Chief of Staff for Logistics (DCSLOG), the Assistant Chief of Staff for Installation Management (ACSIM), the Army Audit Agency (AAA), and the Program Analysis and Evaluation Directorate (PAED). These individuals were functional experts for critical areas such as training, force structure, mobilization, deployment, installation management, and stationing. They provided up-to-date policy information for numerous functional areas. Other members included: BRAC 1991 and BRAC 1993 Army Basing Study team members, previous BRAC Commission staff, and Major Army Command BRAC representatives.

The attributes were divided into the DoD selection criteria to aid in the analysis. Some attributes measure more than one selection criterion. The Information Mission Area (IMA) attribute

measures the future requirements (DoD selection criterion number three) for most categories of installations, but measures mission requirements (DoD selection criterion one) for command and control/administrative installations.

The Army selected 32 attributes to measure the first DoD selection Criterion, Mission Requirements and Operational Readiness: (1) Reserve Training, (2) Information Mission Area (IMA), (3) Barracks and Family Housing, (4) Ranges, (5) Impact, (6) Special Airspace, (7) Applied Instructional Facilities, (8) Capacity - Supply, (9) Maintenance Flexibility, (10) Storage Capacity, (11) Research and Development Facilities, (12) Test and Evaluation Ranges, (13) Test and Evaluation Mission Diversity, (14) Normal Throughput, (15) Staging Areas, (16) Laboratory Facilities, (17) Ops/Admin Facilities, (18) Accessibility, (19) Maneuver Acres, (20) Deployment Network, (21) Mechanized Maneuver Acres, (22) General Instructional Facilities, (23) Capacity - Maintenance, (24) Available Work Force, (25) Production Capacity, (26) Production Flexibility, (27) Ammunition Storage, (28) Test and Evaluation Facilities, (29) Support Facilities, (30) Piers and Wharves, (31) Patient Care Facilities, and (32) Special Cargo Capacity.

The Army selected 11 attributes to measure the second DoD selection Criterion, Land and Facilities: (1) Average Age of Facilities, (2) Percent Permanent Facilities, (3) Quantity - Distance, (4) Maintenance Facilities, (5) Work Space, (6) Barracks, (7) Infrastructure, (8) Environmental Carrying Capacity, (9) Barracks

and Family Housing, (10) Supply and Storage Facilities, and (11) Family Housing.

The Army selected 9 attributes to measure the third DoD selection Criterion, Contingency, Mobilization, and Future Requirements: (1) Buildable Acres, (2) Available Work Force, (3) Deployment Network, (4) Excess Capacity - Storage, (5) Mobilization Capability, (6) Encroachment, (7) Information Mission Area, (8) Excess Capacity - Production, and (9) Excess Capacity - Maintenance.

The Army selected 7 attributes to measure the fourth DoD selection Criterion, Cost And Manpower: (1) Cost of Living Index, (2) Locality Pay Factor, (3) MCA Cost Factor, (4) Mission Overhead, (5) Housing Cost, (6) Basops/Mission Population, and (7) Installation and Base Operating Expense.

Every BRAC 1993 attribute and its definition was reviewed by the HQDA staff and MACOM BRAC teams. The study team refined attributes, as needed, to measure military value better. The type of refinements is important to the process. For example, the Army used the Engineer Strategic Study Center standards to refine attributes for BRAC 1995.

The study team deleted some attributes, refined others, and created new attributes. They deleted twenty BRAC 1993 attributes for the following reasons: They did not discriminate between installations, were unavailable at some Major Army Commands (MACOMS), did not apply to at least 50 percent of the installations in the category, were scaled poorly, measured management action rather than installation capability, were too difficult to quantify, did not

measure one of the four DoD selection criteria, were inconsistent due to site specific factors, or were better measured in another attribute. The list of attributes deleted with reasons for the deletion are as follows:

1. Work force retention -- All scores were high.

2. Location (Depots) -- All values were the same.

3. Manpower Estimating Relationship(MER) -- All MACOMs do not use MER.

4. Cost Estimating Relationship (CER) -- All MACOMs do not use CER.

5. Distance to Training Area -- It applied only to three of eleven installations.

6. Major Unit Support -- Counting the number of units and activities on an installation is not meaningful.

7. Levels of Command -- Counting the number of headquarters on an installation is not meaningful.

8. Joint Synergy -- Counting the number of joint units nearby and boundaries with other service facilities is not meaningful, because the Army can communicate and coordinate with joint components from anywhere.

9. Subinstallation Support - This measures a management decision rather than an installation asset.

10. Construction Investment -- It measures the MILCON program rather than the capability of an installation.

11. Army Readiness -- It represents subjective judgment, and was better measured in the qualitative section of the military value assessment.

12. Location -- It represents subjective judgment, and was better measured in the qualitative section of the military value assessment.

13. Places Rated Almanac -- It is not a measure of military value in one of the DoD selection criteria.

14. Community facilities -- It is not a measure of military value in one of the DoD selection criteria.

15. Average Civilian Salary -- It is specific to installation grade scale, varies if BASOPS is contracted vs in-house.

16. Airport Proximity (Command and Control) -- It is better measured in the deployment network attribute.

17. Accessibility (Command and Control) -- It is better measured in the deployment network attribute.

18. Transportation Infrastructure (Ports) - It is better measured in the Normal Throughput attribute.

19. Material Handling Equipment (Ports) - It is better measured in Support Facilities Attribute.

20. Total Unused Building Admin - It is better measured in the capacity related attributes (Capacity-Maintenance and Capacity-Supply).

The study team refined eight attributes to better measure military value:

1. The Ranges Attribute was expanded to include key training features - Multi-Purpose Range Complex (MPRC), Remote Electronic Target System (RETS) firing points, and standard Military Operations on Urbanized Terrain (MOUT) ranges in addition to total ranges.

2. The Impact Acres Attribute was expanded to assess the ability of the impact area to execute a Joint Army/Air Force Attack Team (JATT) mission, and the ability to fire the Multiple Launch Rocket System (MLRS) [a critical long-range firepower asset].

3. The Maneuver Acres Attribute was modified to include the off-post maneuver rights areas commonly used by the installation, and exclude off limits areas, environmentally sensitive areas, etc.

4. The Contiguous Maneuver Acres Attribute was redefined and renamed Mechanized Maneuver Acres to better capture the installation's capability to provide training space for the most resource demanding training, mechanized maneuver.

5. The Reserve Component Support Attribute was separated into Reserve Training and Mobilization to better align the attributes to the selection criteria. Reserve Training fit within DoD criterion number one (Mission Requirements); Mobilization fit within DoD criteria number three (Future Requirements).

6. The Test and Evaluation (T&E) Ranges Attribute was expanded to consider the size as well as the number of ranges.

7. The T&E Facilities Attribute was expanded to consider the cost of in place equipment as well as the size of the facilities.

8. The Deep Water Piers and Wharves Attribute was changed to Piers and Wharves and now captures several new aspects of (type vessels accommodated, length) in addition to length.

The Army added five new attributes to better measure important aspects of an installation's capability:

1. Special Airspace - This captures a critical and diminishing resource required to conduct aviation training and tactical training.

2. Work Space -- This groups several related facility types under one attribute.

3. Installation and Base Operating Expense (IBOE) - This measures the efficiency of all depot operations and was added to the depot category only.

4. Locality Pay -- This attribute accurately captures the relative cost of civilian labor.

5. Cost of Living Index -- This measures the relative cost to live in a specific geographic area.[46]

Data Collection

The Army used several means to collect data for the IA. The TABS office collected the bulk of the data using a data call. The data call is a memorandum forwarded to the MACOMs that tasked them to collect data related to the attributes. The TABS office assigned an agency for collection, verification, and certification of each attribute.

This approach allowed the MACOMs to check information supplied by Army databases, and allowed the Army staff to check information supplied by the MACOMs. The Army Audit Agency reviewed a statistical sample of the responses for accuracy. The Army Audit Agency and the TABS conducted site surveys throughout the Installation Assessment process to verify information collected.

The data bases used by TABS included: the Army Stationing and Installation Plan (ASIP); Headquarters, Real Property Planning

System (HQRPLANS); and the Installation Facility System (IFS). The Assistant Chief of Staff for Installation Management (ACSIM) monitors and controls these. The Army uses them throughout the year to provide information for management decisions. They include information on facilities, construction projects, and authorized personnel strength.

Open sources used included: the Variable Housing Allowance (VHA) tables, published in the Army Times; the cost of living index, published by the American Chamber of Commerce; and population information, published by the United States Census Department.

The TABS office compiled and maintained all data applicable to the Installation Assessment. Information provided for the Installation Assessment was certified in writing as being accurate and complete by the provider. The MACOMs certified the data call information, the ACSIM certified the data base information, and the TABS office certified the open source data.

Data Entry and Assessment

TABS entered data into the D-Pad model. The Army assigned one analyst to each installation category. This person recorded the information from the data calls and other sources into the D-Pad model, then reviewed the D-Pad model output for trends. The Army's report contains the final D-Pad results. An example of the D-Pad printout for the professional schools category follows in table 2. The output shows which raw values were advantageous to the installation (+, ++) or disadvantageous (-,--) to the installation. Table 2 shows that Fort Leavenworth was the highest scoring installation in its category (7.0), West Point was second (5.4),

Carlisle Barracks third (3.7) and Fort McNair (2.3) last. The Army produced and published D-Pad output, similar to table 2, for every installation category during BRAC 1995.

Table 2. BRAC 1995 D-Pad Installation Assessment Printout for Professional Schools.

ATTRIBUTE	WEIGHT	CARLISLE	LEAVENWORTH	FT McNAIR	WEST POINT
RESERVE TRAINING	50	0.0-	7.7+	0.0-	8.3+
APPLIED INST FAC	135	128,434++	78,000+	0--	4,300--
GENERAL INST FAC	235	260,000--	651,000++	452,400--	807,575++
IMA	30	1,230	1,350	535-	1,090
MISSION REQ	450	3.6	7.1	1.8	6.7
WORK SPACE	60	131,000-	773,000+	188,200-	1,084,000+
FAMILY HOUSING	40	612-	2,910+	1,526	1,546
UPH	20	78	1,229	201	407
%PERM FAC	30	97.8%	96.8%	99.8%	94.00%-
FACILITIES AVG AGE	25	42.90	38.90	40.35	44.54
INFRASTRUCTURE	25	1.2	9.6	0.9	5.6
ENVIRONMENTAL CAP	25	7.4	6.3	7.5	8.1
LAND/FAC	225	2.2	8.0	4.1	5.2
MOB CAPABILITY	65	1.0-	2.0	2.0	9.0++
BUILDABLE ACRES	35	32	1,814+	2	0
ENCROACHMENT	25	301.758	326.217	1,098.547-	256.818
FUTURE REQ	125	2.5	5.7	1.0	6.7
COL INDEX	50	104.900	98.900+	135.100-	119.580
HOUSING COST/DU	15	$8,250	$6,840	$20,047	$7,945
LOCALITY PAY	30	1.0309	1.0330	1.0423	1.0800-
BASOPS FACTOR	60	11016.610	7833.730	5851.030	5625.100
MILCON COST FACTOR	30	0.98	1.06	1.03	1.23-
VHA	15	405.200	345.780	1,359.360	1,207.840
COST/MANPWR	200	6.5	6.5	2.4	1.9
SCORE	1000	3.7	7.0	2.3	5.4
RANK		3	1	4	2

(Source: U.S. Department of Defense, Report to the Base Closure and Realignment Commission: Volume II - Installations Assessment Process and Supporting Data (Washington, D.C.: April 1995), 65.)

BRAC 1995 Army stationing strategy

The Army stationing strategy is a document produced specifically for the BRAC process. It was developed by the office of the Deputy Chief of Staff for Operations (DCSOPS). It provides an operational context for base closure planning and analysis. It derives from the National Military Strategy and provides a long-range assessment of future basing requirements. Its is to preserve the Army's readiness to fight and win wars.

The stationing strategy was developed using capacity analysis plus operational insights and military judgments from senior Army leaders. It was developed in conjunction with the IA. The final IA rankings and outputs were available to senior leaders as they formulated the Army stationing strategy. The structure used to derive the stationing strategy was the Headquarters, Department of the Army (HQDA), staff action process. This is a process by which a draft policy can be coordinated and reviewed throughout the Department of the Army. It does not have a formal structure, but is tailored to provide specific input and guidance from required agencies and sources.

The Army stationing strategy was developed to ensure retention of the necessary installation infrastructure to support the National Military Strategy. The Army developed this strategy after the IA was complete; thus the Army leadership used judgment to overrule the IA results when operational considerations required. Some of the additional considerations used to produce those operational requirements are listed below.

1. Power Projection. Develop and maintain the capability to rapidly deploy and sustain decisive combat forces from bases in the United States to any region of the world.

2. Versatility. Maintain the capability to respond to a wide variety of missions, across the full range of military operations and environments; performing at the tactical, operational, and strategic levels of warfare while smoothly transitioning from one mission to another.

3. Strategic Agility. Develop and maintain the ability, through strategic mobility and stationing, to deploy and strike faster than a potential enemy.

4. Deterrence. Maintain sufficient global military capability to convince adversaries that the cost of aggression will exceed any possible gain.

5. Training and Education. Maintain a high quality of combined, joint, and service specific training in both individual training conducted at institutional schools and collective training conducted at home station, major training areas, and Combat Training Centers.

6. Leader Development. Provide for the continuous professional development of Army leaders - a requirement paramount to achieving battlefield success with the minimum cost in terms of lives and resources.

7. Sustainment. Develop and maintain the ability to sustain large ground combat forces from bases in the nation's power projection strategy.

8. Technology Development. Maintain technological superiority to counterbalance potential adversaries, reduce risk, and enhance the potential for swift, decisive conflict termination.

9. Acquisition Excellence. Provide a flexible industrial base, capable of providing an uninterrupted flow of critical supplies, on short notice, without major retooling.

10. Force Generation. Size the operational and industrial base infrastructure to support force generation contingencies resulting from the requirements to conduct two, near-simultaneous, major regional conflicts.

11. Fiscal Responsibility. Adequately fund a balanced program of critical operational and infrastructure requirements, assisted by the reduction of infrastructure costs commensurate with the force drawdown.

12. Environmental Stewardship. Conserve environmental resources to ensure availability of training lands both now and in the future.

13. Quality of Life. Provide soldiers and their families a quality of life designed to attract and retain quality volunteers to man a modern, professional Army.[47]

Final Military Value assessments for BRAC 1995

The Army leadership combined the IA and the Army Stationing strategy to produce the final military value for its installations.

This resulted in high or low military value. The installations determined to be low in military value were considered for closure or realignment. The Army stationing strategy provided the basis for assessing either high or low military value. If an operational requirement existed to keep an installation open, a low quantitative score on the IA was insufficient for the installation to be studied for closure.

Analysis of DoD Selection Criteria Five through Eight

Following the military value results, the Army developed alternatives for each installation of low military value. These were scenarios to close or to realign the installation. For some installations with low military value there were many alternatives, while others had few. The alternatives were developed by the Army staff and MACOM staffs, based on the availability of facilities at the gaining installations and on the last four DoD selection criteria. This thesis does not analyze the process used to address the last four criteria and presents this discussion only to show how the military value assessment fits into the overall BRAC process.

DoD selection Criterion Five

This addresses the cost and savings that occur when an installation is closed or realigned. The Army used a DoD standard model to assess these, called the Cost of Base Realignment Actions (COBRA) model. COBRA was developed by the Logistics Management Institute (LMI) as a spreadsheet for use by the 1988 BRAC commission. It was rewritten in PASCAL language in 1991 by Richardson & Kirmse, Inc., for use in BRAC 1991. The Army was appointed by OSD as the

Executive Agent for COBRA in December 1991. Refinement of the model has been continuous during the past BRAC rounds. This refinement has been conducted using a Joint Process Action Team (JPAT) comprised of all services and OSD. The contract cost has been shared by all services.

The COBRA model considers three major costs: (1) the cost of operations before the proposed realignment or closure, (2) the cost of operations after the proposed realignment or closure, and (3) the cost to implement the realignment or closure.

To estimate recurring costs and savings, it uses base operations and support (BOS) costs, real property maintenance costs (RPM), family housing operations costs, communications costs, and personnel costs (salaries, variable housing allowance (VHA)). To estimate one-time costs and savings, COBRA uses military construction, family housing construction, transportation costs (freight, vehicles, special equipment), personnel costs (severance pay, unemployment, Homeowner's Assistance Program (HAP), Department of the Army Relocation Services Entitlement (DARSE), and early retirement pay). Costs not computed by COBRA are costs that the Army is obligated to pay regardless of a BRAC action, such as: environmental cleanup, terminal leave pay, regular retirement pay, and PCS costs associated with normal rotations of personnel. COBRA is accurate in determining which of several options is the most affordable. It is not as accurate in predicting the actual costs of a realignment or closure scenario; however, COBRA output must be refined during the budget process.

DoD Selection Criteria Six and Seven

The Army measured the economic impact on communities with a simple computer model that calculates the percent of jobs lost, or gained in the local area if the realignment, or closure was approved. The potential jobs lost was the factor presented to the Army leadership during the decision analysis. The Army also considered the ability of the communities to support the proposed realignment action by analyzing the community infrastructure, work force available, and other factors about the local community.

DoD selection criterion Eight

The Army measured the environmental impact of a realignment scenario by conducting an environmental baseline study. This study determined the major environmental problems that could occur at every installation involved in the scenario (losing and gaining installations).

The Army's Final Recommendations

The Army's final BRAC 1995 recommendations considered all eight DoD selection criteria, giving priority consideration to the analysis of military value. The Army's recommendations were published in the following format: (1) Recommendation, (2) Justification, (3) Return on Investment, and (4) Impacts. As an example, the recommendation to close Bayonne Military Ocean Terminal follows:

Bayonne Military Ocean Terminal, New Jersey

1. Recommendation: Close Bayonne Military Ocean Terminal. Relocate the Military Transportation Management Command (MTMC) Eastern Area Command Headquarters and the traffic management

portion of the 1301st Major Port Command to Fort Monmouth, New Jersey. Retain an enclave for the Navy Military Sealift Command, and Navy Resale and Fashion Distribution Center.

2. Justification: This recommendation is supported by the Army's long range operational assessment. The primary mission of Bayonne is the shipment of general bulk cargo. It has no capability to ship bulk munitions. There are sufficient commercial port facilities on the East and Gulf coasts to support power projection requirements with a minimal loss of operational capability. Bayonne provides the Army with few capabilities that cannot be accomplished at commercial ports.

3. Return on Investment: The total one-time cost to implement this recommendation is $44 million. The net of all costs and savings during the implementation period is a cost of $8 million. Annual recurring savings after implementation are $10 million with a return on investment expected in 5 years. The net present value of the costs and savings over 20 years is a savings of $90 million.

4. Impacts: Assuming no economic recovery, this recommendation could result in a maximum potential reduction of 2,105 jobs (1,367 direct jobs and 738 indirect jobs) over the 1996-2001 period in the Jersey City, NJ Primary Metropolitan Statistical Area, which represents 0.8 percent of the area's employment. There are no known environmental impediments at the closing or receiving installations.[46]

This format shows how the Army used the BRAC process to complete the justification, fiscal analysis, and impacts for each BRAC 1995 recommendation. It condensed the Army's analysis to one page or less for each recommendation. Underlying each recommendation was the detailed analysis of the installation military value using DoD selection criteria one through four, the further analysis of the realignment or closure scenario using DoD selection criteria five through eight, and the Secretary of the Army's final decision.

CHAPTER 4

ANALYSIS

Introduction

This chapter contains an introduction, eight major discussion sections, and a conclusion. The introduction describes the research methodology. Each major section contains an analysis of a decision-making step discussed in the methodology section. The first three sections analyze aspects of the military value process common to both the Installation Assessment and the Army stationing strategy: (1) problem definition, (2) goals and objectives, and (3) methodology. The next four sections analyze specific aspects of the Installation Assessment: (4) selection of attributes, (5) weighting, (6) data collection, and (7) modeling. The last major section analyzes the final decision for military value: (8) how the IA and stationing strategy were combined into the military value during BRAC 1995.

Research Methodology

The Army's BRAC military value process presents a difficult problem in analysis. Ideally, a process used to produce decisions could be judged on the accuracy or correctness of those decisions. As an example, a good method of predicting the weather could be judged of the accuracy of the predictions. A good stock prediction could be judged on the amount of profit it produces. A decision process should be evaluated on the extent to which it achieves its

objectives. A good decision in military value analysis allows the Army to eliminate excess infrastructure.

A key factor in this research is that the answer cannot be used to judge the process. This thesis can review the process for soundness, structure, logic, efficiency and other factors that are indicators of a good process, drawing the conclusion that a good process should produce good decisions. However, we cannot determine if the decisions regarding the military value of Army installations are accurate, because the correct military value is not known. Potentially, this thesis could design a second process, produce another list of military values and compare the results. This idea is dangerous because it sounds simple. Many organizations that fought against BRAC recommendations used this strategy, but the flaw in it is obvious: How can it be determined if the second process is any better that the first?

This thesis uses a step-by-step approach to explore the Army's complex military value process. It then looks at the secondary questions developed in chapter one, and develops tertiary questions that help resolve the issues. Finally, it provides an analysis of the Army's BRAC military process using the methodology described.

Framework for Analysis

The analytic framework is based on two aspects of the decision-making process: the actions taken by the Army and the adequacy of those actions. To simplify the military value process, it is decomposed into several smaller components that are the key areas. The framework, the secondary and tertiary research questions

develop and explore the topic to reach a conclusion. The analytic elements are: (1) definition of the problem; (2) definition of the goal or objective; (3) choice of the methodology(ies) to achieve the objectives; (4) selection of the attributes for selecting which is the best alternative; (5) construction of the interrelationships between the objective, alternatives, data, and the outcome; (6) assembly of the relevant data; (7) prediction of the outcomes for each alternative; and (8) choice of the best alternative to achieve the objective.[49]

Test of Adequacy

Because this thesis seeks to determine the adequacy of the Army's military value process, it is necessary to define the term adequacy and show how it is tested. Adequacy is "the state of being lawfully and reasonably sufficient for a specific requirement."[50] The thesis investigates whether the Army's military value process is lawfully and reasonably sufficient, not whether the Army used the best possible process.

The "specific requirement" for the military value analysis was given to the Army by the OSD in the 1995 Base Closure and Realignment Selection Criteria, dated 2 November 1994.[51] This policy states that in selecting installations for closure or realignment, the DoD will give priority consideration to military value.[52]

The measures used to determine "sufficiency" are soundness, logical construction, consistency, and efficiency. Due to the nature of the eight analytic elements, some of these do not apply to all elements.

Soundness

Soundness is defined as "free from flaw or defect, based on thorough knowledge and experience, logically valid and having true premises."[53] This definition yields a secondary research question: Is the Army's current methodology for computing the military value of installations free of major computational flaws?

Logical Construction

Logical construction is defined as "using reason in an orderly cogent fashion."[54] This definition raises a secondary research question: Is the Army's current methodology for computing the military value of installations logically constructed?

Consistency

Consistency is defined as "agreement or harmony of parts to the whole, ability to be asserted together without contradiction."[55] The secondary research question here is: Is the Army's current methodology for computing the military value of installations consistent?

Efficiency

Efficiency is defined as "productive of the desired effects without waste, or wise use of resources."[56] The secondary research question for this measure is: Is the Army's current methodology for computing the military value of installations efficient?

Structure of the Analysis

The analysis of the actions and the adequacy of the process provide the analytic framework. Within this framework, many

supporting questions are generated about the Army's military value process. These elements are listed and defined in the following section, and questions that test the adequacy of the Army's process are listed in each paragraph.

Definition of the Problem

This section explores the framework supplied by the Army. In simple terms, the questions are: How did the Army define the military value of its installations? How did the Army allocate resources to accomplish this analysis? (Note: The following decomposition is applied identically to (1) definition of the problem, (2) definition of the goal or objective, (3) choice of the methodology, (4) selection of the attributes, (5) construction of the interrelationships (weighting), (6) assembly of the relevant data, (7) prediction of the outcomes, and (8) choice of the best alternative to achieve the objective.

1. Policy. What was the Army instructed to do by the OSD? When was it given instructions? How was it given policy guidance?

2. Army Process. How did the Army define military value? How did it structure the analyses? Was problem definition passed to subordinate agencies? Was its vision of military value clearly articulated?

3. Test of Adequacy. Was the Army's definition of military value free of flaws? Was it based on thorough knowledge and experience? Did the Army's problem definition provide a basis for a logical conclusion? Did its definition of the problem differ from OSD's? How was it different? Did its problem definition change during the BRAC process? Did it use its resources wisely?

4. What improvements to the Army's problem definition are needed to assist in a better assessment of military value? Can military value be better defined?

Definition of Goals or Objectives

This section analyzes the Army's military value goals. Did these goals and objectives assist in providing a good analysis? Did the Army publish goals and objectives? If so, were they obtainable? Did they describe exactly what the Army wanted to accomplish?

Choice of the Methodology(ies) to Achieve the Goals and Objectives

This section investigates the overall methodology used by the Army to conduct the military value analysis. It reveals how the Army had to surmount difficult problems in organizing and analyzing data. The choice of decision-making methodologies is the key to the process. Were the methodologies used by the Army to determine military value appropriate? Why did it choose to use subjective methodologies? Why did it choose to use objective methodologies?

Selection of the Attributes

The Army military value process used a set of attributes to judge the military value of its installations. These attributes were quantitative measures of the capabilities of an installation to support the Army's overall mission. They reflected the leadership's view of what is important to the Army in installation support.

Construction of the Interrelationships Between the Objective, Alternatives, Data, and the Outcome

This section explores how the Army applied weighting to attributes in the IA. Weighting of factors provides help in discriminating between installations with similar capabilities.

Gathering of Relevant Data

This section investigates how the Army obtained data for use in the military value analysis. Data gathering is a critical point in any analysis. The manner in which data are obtained and handled often affects the results of the analysis.

Prediction of the Outcomes for Each Alternative

This section explores the model used by the Army to produce the final assessment of the quantitative data and the weights. The Army used the D-Pad model to provide the final ranking of each installation for the quantitative assessment.

Choice of the Best Alternative to Achieve the Objective

This section investigates the Army's final installation military value decisions. This involved combining the qualitative and quantitative information from the Installation Assessment and the stationing strategy. How did the Army do this? Can it be done better? At the conclusion of all the analysis, a decision was still required to approve the final military value of all Army installations. How did the Army approve the final military value list?

Assessment

After the analysis is complete, an overall assessment is made of the Army's military value process. The final determination is based on the adequacy of the eight steps analyzed.

Limitations to Relevancy of this Methodology

The methodology used in this thesis results in a final decision that is purely subjective. Even the most rigid "standards" for adequacy will have some room for interpretation. Further, this methodology is a "broad brush" approach testing solely for adequacy, with no detail nor projection of any potential "best" solution.

The methodology does not attempt to analyze some of the intangible factors involved in the military value analysis, like personalities and politics.

Analysis of Military Value Definition

Policy Guidance for Military Value Definition

OSD guidance was provided to the Army in the form of policy memoranda. The Army was instructed by OSD to consider military value in selecting installations for closure or realignment. Military value is measured by the following four criteria:

> (1) The current and future mission requirements and the impact on operational readiness of the DoD's total force.
> (2) The availability and condition of land, facilities and associated airspace at both the existing and potential receiving locations.
> (3) The ability to accommodate contingency, mobilization, and future total force requirements at both the existing and potential receiving locations.
> (4) The cost and manpower implications.[57]

Military value is therefore *something* that considers the four above factors. OSD policy does not specify how military value

is measured. OSD's definition does not specify whether it be numeric (1.0), qualitative (good, bad, red, green, blue), or ordinal (which is best, second best, etc.). In fact, OSD policy does not require publication of military value.

The policy letter addressing military value was issued to the Army in December 1994. However, because it was staffed in advance of publication, the Army knew that the definition of military value had not changed from previous BRAC rounds.

Adequacy of the Military Value Definition

The Army's BRAC 1995 definition of military value complied with all policy requirements. It was based on thorough past measurements of the four DoD selection criteria. The Army's procedural change between BRAC 1993 and BRAC 1995 improved its operational definition of military value. In BRAC 1993, the Army recommended Fort McClellan, Alabama, for closure, though it was not the lowest ranked installation in its category (Fort Lee, Virgina, was lower in military value, but was not recommended for closure). During BRAC 1995, Fort McClellan again was higher in the quantitative assessment than Fort Lee; but the military value assessment of both installations was low, so both were studied for closure.

The Army conducted the MVA in BRAC 1991 and BRAC 1993 using only quantitative data, even though the Army did not want the military value of its installations to be determined by quantitative factors alone.

> Such decisions (military value) are complex and are made using a combination of quantitative and qualitative decision-support tools, logic, and professional judgment.[58]

The Army's problem definition supported the development of a logical conclusion. The Army explains how this logical conclusion can be reached by combining quantitative and qualitative measurements:

> It must be kept in mind that there is no simple mathematical formula which can be used to determine which bases should close. Therefore the comparative rankings provide a point of departure from which a detailed analysis of the realignment and closure potential of the installation can begin. Furthermore, unique considerations are not easily addressed with standard, uniform criteria. Unique capabilities and functions must receive consideration before any decision to close or realign an installation is made.[59]

Also, the logical conclusion derived from the new military value ranking system (high and low military value) was to study only the low ranked installations for possible closure. Previously, the Army had studied installations for closure based on their numeric ranking from one to ten, and their rank order within the installation category.

The Army's definition of military value was the same as OSD's and remained the same throughout the BRAC process. The Army's definition of military value appears to be sound, logical, and consistent.

Analysis of the Goals and Objectives

Policy Guidance for Goals and Objectives

No policy guidance was published by OSD concerning the goals or objectives of the military value analysis. However, OSD did publish an overall minimum reduction goal of 15 percent of DoD-wide plant replacement value (PRV). PRV is the estimated cost to replace the facilities.

Adequacy of Goals and Objectives

The Army has never set a quantitative goal for the military value analysis. The implied goals were to: (1) provide a starting point in the evaluation of base structure and (2) provide the senior Army leadership a measure of the relative value of installations and facilities. These goals were not measurable nor consistent with OSD's goals. The implied goals were not detailed enough to add to the analysis.

The Army should review OSD guidance and provide clear, measurable, consistent goals and objectives. If OSD wants to reduce PRV by 15 percent, the Army's goal should be to identify 15 percent of the installations that have low military value.

Analysis of the Military Value Assessment Methodology

This section describes the methodologies the Army used to produce military value and analyzes the installations and categories selected for the study.

Policy Guidance for Military Value Assessment Methodology

The OSD policy memorandum stipulates several requirements for the analysis of military value.

> The studies (military value) must be based on analyses of the base structure by like categories, using:
> 1. objective measures for the selection criteria, where possible;
> 2. the force structure plan;
> 3. programmed workload over the Future Year Defense Plan (FYDP); and,
> 4. military judgment.[60]

The following sections provide detailed analyses of the installations studied and the categories selected for the Army's BRAC 1995 military value assessment.

Analysis of the Installations Studied

Policy Guidance for Installations Studied

In January 1994, the Secretary of Defense (SECDEF) guidance established policy, procedures, authority, and responsibilities for selecting bases for realignment or closure. The SECDEF policy memorandum stated in part:

> The numerical thresholds established in the law require its application for the closure of installations with at least 300 authorized civilian personnel. For realignments, the law applies to actions at installations with at least 300 authorized civilian personnel which reduce and relocate 1000 civilians or 50% or more of the civilians authorized.
>
> DoD Components must use a common date to determine whether Public Law 101-510 numerical thresholds will be met. For BRAC 1995, the common date will be September 30, 1994.[61]

Adequacy of Installations Selected for Study

The Army was not consistent in including or removing sub-installations in the military value analysis. In some cases they were studied separately (Fort Pickett, Virginia was a sub-installation of Fort Bragg, North Carolina), in other cases they were not studied separately (Fort Story, Virginia, a subinstallation of Fort Eustis, Virginia). Both Fort Story and Fort Pickett were below the BRAC law personnel threshold, both are stand alone properties, and both installations have designated installation commanders. Why did the Army study one and not the other? The Army's report states, "after some installations were aligned with their parent for analysis", the list of installations was finalized.

The alignment of installations together (installation plus subinstallation) is unfair in the computation of military value. First, the combined assets in facilities, land, and other measurable attributes allow the parent and subinstallation combination to score

higher quantitatively than the separate subinstallation. Second, the subinstallation lacks visibility as a study candidate, it will not be selected for closure.

The Army failed to gather a comprehensive list of minor sites at the start of the BRAC analysis. They decided to include minor sites only after the military value had been determined for the other installations. The selection of minor sites for study was done by the MACOM headquarters, not the Army staff. Each MACOM provided minor sites for study, based on their internal determinations that they had "no military value."[62]

In selecting installations for study, the Army followed OSD guidance and was generally consistent. The Army was logical in its selection of installations for study, except for the selection of minor sites and in how it grouped installations. The Army's procedures for selecting of installations appears adequate but definitely could be improved.

Analysis of Categories Selected

Policy Guidance for Installation Categories

OSD provided guidance for determining categories of bases for BRAC analyses:

> One of the first steps in evaluating the base structure for potential closures or realignments must involve grouping installations with like mission, capabilities, or attributes into categories, and when appropriate, sub categories. Categorizing bases is the necessary link between the forces described in the Force Structure Plan, programmed workload, and the base structure.[63]

Adequacy of Installation Categorization

The Army's process for determining categories was subjective. TABS office produced a draft list of installations and categories based on previous BRAC analysis, and the list was staffed with the MACOMs and other Army agencies. The final decision on categories was made by the Army leadership, based on the mission, facilities, attributes of each installation, and historical information. The categories are reasonably consistent with the previous BRAC analysis, and meet the requirements from OSD.

The Army placed each installation in only one category, regardless of how many different mission were performed at the installation. Almost all installations are multipurpose and perform missions in more than one category. For example, Fort Hood, Fort Bragg, and Fort Lewis are all considered maneuver installations; however, they also house Corps headquarters, provide large training areas, and support other activities. They all have similar capabilities, missions and, attributes as command and control installations. Unless these installations are grouped together for analysis and separated from other maneuver installations, the Army will not be able to get a true picture of the capacity within a given set of installations. This type of analysis may show that: a maneuver installation may be the best site to locate a Major Army Command headquarters (Forces Command), a training installation may be the best site for Training and Doctrine Command, etc.

The Army sometimes included within a category installations lacking some of the measurable attributes. The Presidio of Monterey was considered a training school, but had no ranges, no maneuver

acres, nor impact acres. All of these attributes were selected by the Army leadership as essential to training schools. The Army should either consider the Presidio of Monterey in another category or amend the list of essential attributes for training schools.

The Army analyzed leased installations and minor sites separately. Being a leased facility or a minor site is not a mission. The leased and minor sites do not all have similar attributes, missions, or capabilities. Leased facilities and minor sites perform particular missions, and they should be evaluated with installations performing those same missions. Within minor sites, the Army lumped ammunition plants, training areas, prisons, recreation facilities, administrative facilities, and cemeteries. The Army cannot obtain a measure of capacity for this category of installations as it is currently structured.

In selecting categories, the Army followed OSD guidance, and was generally consistent with previous BRAC analysis. The categorization process was subjective, but appears reasonably sound, except where the Army included installations in categories when they were lacking attributes that define that category. The Army appeared to be logical in its categorization of installations, except for separately categorizing leased, and minor sites.

The categorization of installations appears adequate but could be improved by considering multipurpose installations in a separate category; categorizing leases and minor sites by mission; and including installations only in categories where they have like attributes.

Analysis of Attributes Selected for Study

Policy Guidance for Attributes

OSD policy states that "DoD components must develop one or more measures/factors for applying to each of the final criteria."[64]

Analysis of Attribute Selection

The formation of a study group is an accepted way to investigate and combine the opinions and concerns of a large population. Staff action and staff coordination was accomplished in the final determination of attributes. The Army conducted reviews of the attributes after each BRAC round, with the intent to improve attribute development continually. The Army has shown the willingness to change attributes when reason dictates.

The Army developed and refined attributes that measure DoD criteria one and two: mission requirements and land and facilities. An example is in the measurement of maneuver acres. The BRAC 1993 process established the description of maneuver acres as:

> 1. DEFINITION: The total acreage of the installation available for maneuver and training.
> 2. PURPOSE: To measure the overall land size of the installation available for maneuver which is an important element in stationing and training land forces. This is one of several factors used to assess the relative size of installations.
> 3. METHODOLOGY: The total maneuver acreage identified in HQRPLANS as validated by installations. [Headquarters Real Property Planning System (HQRPLANS) is a data base used to collect management information for the Army leadership][65]

In BRAC 1995 this measure was refined to include maneuver rights areas and to exempt areas not used for maneuver and training.

> 1. DEFINITION: Same as BRAC 1993.
> 2. PURPOSE: Same as BRAC 1993.
> 3. METHODOLOGY: Summation of the total maneuver acreage identified in HQRPLANS as verified by MACOMs and validated by installations. Maneuver acreage will include only land used as

maneuver and training area. Impact areas, cantonment areas, ranges, off limits areas, and environmentally sensitive areas that are considered unusable will not be included. Maneuver rights areas will be included in computations at a value of one half of the value of Army-Owned Acres.[66]

Other important clarifications and additions for BRAC 1995 in installation capabilities (maneuver acres, mechanized maneuver acres, impact acres, specialized airspace, etc.) provided a better picture of an installation's ability to support troop units. The supporting installations like ports, production facilities, and proving grounds all have unique and meaningful measurements of their mission support capabilities.

In measuring the land and facilities, the Army also has improved every BRAC round. The measures have become more uniform and more accurate. One improvement for BRAC 1995 was the addition of the work space attribute. This attribute combines various types of facilities (such as maintenance, operations, and administration) into one category. This change gives more credit to installations that support a wide range of missions and units. The installations were allowed to count programmed construction and improvements in their analysis.

The Army needs to improve attributes for DoD selection Criterion three -- future requirements. The attributes used are all from BRAC 1993, and no real improvements were made. The measurement of excess capacity in production, storage, and maintenance is a questionable attribute. Is it good to have surplus capacity? It is clearly not efficient. However, the attribute considers it an advantage to have excess capacity. An installation with many facilities and NO MISSION will score high in this attribute.

Encroachment is a measure of the population density of the surrounding area. At a large installation that has room to conduct its mission away from the installation boundaries, the local population cannot encroach as much as at a small installation that has to conduct missions near its boundaries. The Army should just measure the size of installations. Dugway Proving Ground, Utah, has the lowest (and best) value in encroachment (3.9), but both White Sands Missile Range (38.3) and Yuma Proving Ground (20.8) are larger and more remote installations.

The mobilization capability attribute measures: mobilization billets, deployment network, ranges, maneuver acres, mechanized maneuver acres, and work space. Every measure except mobilization billets is the same as some other attribute. The Army should weight the other attributes higher and add an attribute named mobilization billets. The mobilization capability attribute is needlessly confusing.

Buildable acres is another attribute that is a poor measure of future requirements. The Army can build almost anywhere on any installation, but the attribute definition counts only "land zoned for administration, housing, industrial, maintenance, supply or storage, or community facilities, that are not currently filled with permanent facilities.[67]" Again, the Army should just measure the size of the installation.

The Army has failed to develop attributes that assess the efficiency (cost and manpower implications) of an installation. The major problem with this measurement is the inability compute installation operating costs. A theoretical measure of efficiency is

the support cost divided by population. In BRAC 1995, the Army used the BASOPS/MISSION POPULATION attribute as a measure of efficiency, but it was plagued by problems. First, the BASOPS funding to installations is done by the MACOMs, which prevented HQDA from tracking the BASOPS funds spent by individual installations. The only certifiable and accurate data base of BASOPS funding is provided by the DoD Finance and Accounting System (DFAS), which captures all funds spent down to the "fiscal station" level of detail. However, there are instances of more than one installation per fiscal station. For example, Fort Monroe, Fort Story, and Fort Eustis, Virginia, are all in the same fiscal station. Another problem is that BASOPS support does not always come from BASOPS funds. Other funding sources are commonly used for BASOPS missions. Training or environmental funds have been used to accomplish BASOPS missions and are not recorded as part of the installation's BASOPS cost.

Units stationed on the installations (such as engineers) often perform BASOPS functions. Soldiers perform BASOPS missions as part of the garrison staff, and their salaries are not included in the calculation of BASOPS costs. Installations that have large, predominately military garrison staffs need fewer BASOP salaried civilians to complete the same missions. Installations also use soldiers as borrowed military manpower (BMM) to perform garrison mission while not in a garrison position. Some installations contract for their BASOPS functions, and others hire and pay salaries. Salaried employees get benefits, such as retirement, that must be factored into the cost equation, but are usually not included. The reason the Army could not measure the efficiency of

installation for three BRAC rounds is it does not know the total support costs for each installation. There is no system in place to capture these so meaningful comparison is impossible.

The cost of living index was a poor measure because it was not available at all installations, and it did not measure the cost and manpower implications to Army soldiers. This attribute is taken from the American Chamber of Commerce Research Association (ACCRA), and measures the relative price levels for consumer goods and services based on local community input. It should not apply to military families, because they have access to the post exchange and commissary facilities.

Another poor measure of cost implications is locality pay. This measures the additional pay given to civilian employees in certain high cost areas, such as San Francisco; Washington, D.C.; and Boston. Locality pay only affects a few Army installations.

There are three attributes in the cost and manpower category that measure the cost implications. The military construction (MCA) cost factor, the variable housing allowance, and the housing cost per dwelling unit actually measure some of the Army's costs for keeping an installation open. Data for these three attributes are available at every Army installation.

In selecting attributes, the Army followed OSD guidance and was generally consistent. The Army appeared to use a sound process to select attributes, based on past experiences and on expertise. Attribute selection appears to be logical, with the exception of the attributes measuring cost and manpower implications and excess

capacity. The selection of attributes was adequate but should be improved by providing better measures of installation efficiency.

Analysis of Weighting

OSD published no policy guidance on weighting. The Army assigned a total of 1,000 points to each category of installations and weighted the first DoD selection criterion 450 points, the second 225 points, the third 125 points, and the fourth 200 points for all installation categories. The study group that developed and refined the attributes also developed the weights. Army leadership approved the weights and attributes at the same time.

The Army's weighting method applies greater weight to the more important attributes. The final weights were subjectively set by the Army leadership. To check for areas where weights might have a large impact on the results, TABS conducted a thorough sensitivity analysis of the final weighting for each installation category. The final IA rankings of all categories were not sensitive to moderate changes in the weights of single attributes, nor in changes of the weights of the four selection criteria. Table 3, shows how the ranking of installations change when the weighting of the first DoD selection criterion, mission requirements changes from 0 to 900 points (out of 1,000). The asterisk on the table shows the value used in the final analysis, 450 points. It shows that the rankings are fairly insensitive to large changes in criteria weights. Only one installation changed in placement within the range 360 points to 540 points (Fort Stewart changed from fourth to fifth).

TABS conducted this type of analysis for each category of installation and found no sensitivity issues from criteria weights.

TABLE 3. Sensitivity Analysis for the Weighting of the Mission Requirements DoD Selection Criteria for Maneuver Installations in BRAC 1995.

Alternatives	Weights:	0	180	360	540 *	720	900
Bragg		2	2	3	3	4	4
Campbell		4	6	6	6	6	6
Carson		4	5	5	3	3	3
Drum		8	8	8	8	8	8
Hood		1	1	1	1	1	1
Lewis		6	4	2	2	2	2
Richardson		10	11	11	11	11	11
Riley		7	7	7	7	7	7
Schofield		10	9	9	9	9	9
Stewart		3	3	4	5	4	4
Wainwright		9	9	10	10	10	10

TABS conducted a similar analysis for each attribute. The results of one such analysis is in table 4. This analysis changes the maneuver acres attribute from 0 to 160 points (out of 1,000). Note that the final rank of installations is not very sensitive to the weighting of individual attributes.

TABLE 4. Sensitivity Analysis of the Change in Rankings caused by a Change in the Weight of Maneuver Acres, within the Maneuver Installations Category during BRAC 1995.

Attribute: Maneuver Acres

Alternatives	Weights:	0	32	64 *	96	128	160
Bragg		2	3	3	3	5	5
Campbell		6	6	6	6	6	6
Carson		5	5	5	4	3	3
Drum		8	8	8	8	8	8
Hood		1	1	1	1	1	1
Lewis		3	2	2	2	2	2
Richardson		11	11	11	11	11	11
Riley		7	7	7	7	7	7
Schofield		9	9	9	9	10	10
Stewart		4	4	4	4	4	4
Wainwright		10	10	10	9	9	9

The lack of sensitivity to weighting is due to several factors. First, the attributes are scaled to favor larger, newer, and more economical installations. Any combination of weights will still rank this type of installation higher. Secondly, there are enough attributes that a change in one attribute weight will not affect the result greatly.

In applying weights to attributes, the Army was consistent. It appears to use a sound process to determine the weighting, and to have conducted thorough sensitivity analyses. Moderate weighting changes did not affect the final rankings. The Army's attribute weighting process appears adequate.

Analysis of Data Gathering

Policy Guidance for Data Gathering

OSD policy dictated that the Army develop internal control plans to ensure accuracy of data collection.[68] These control plans should include:

1. Uniform guidance on defining data requirements and sources;
2. Systems for verifying accuracy of data; and
3. Documentation justifying changes made in data supplied.[69]

All data used in 1995 BRAC analyses were to be certified by the provider as accurate and complete. OSD required the Secretary of the Army to certify this also in writing.[70]

Adequacy of Data Gathering

The Army's data gathering techniques varied to accommodate the data element. The data that supported the military value analysis were reported by the AAA and GAO as generally accurate and consistent. The Army demonstrated consistency throughout the data

collection process. The data sources generally were the same as in previous BRACs and met all OSD requirements.

The Army appears to have constructed the data gathering process logically, based on the available sources. It asked the appropriate agencies for data and had other agencies verify and certify their accuracy. However, the Army's method of using data calls is costly in time and manpower. This data call system requires each level of command from HQDA to MACOM to the installation to maintain a BRAC staff for the duration of the data calls and assessment of military value. The data calls required at least one month to complete, since they were passed down to the installations through the MACOMs, and back up to HQDA. Any data required in less than one month had to be individually managed and handled by the analysts. These data also caused a storage and filing problem, because they are all on paper.

The HQDA data bases required no additional staff and provided nearly immediate feedback. An existing data base management staff handled the BRAC workload without problems. These data bases are maintained year round and provide generally accurate data. They also provide an opportunity for analysts to use searches or other interfaces to format the output in a specific manner. The Army collected efficiently open source data, and the data were distributed to all TAB's analysts.

In gathering data, the Army appeared to be consistent and used a logical method. The data gathered were generally accurate. The Army should improve its capability to use standard data bases to increase the efficiency of data gathering.

Analysis of the D-Pad Model

No policy guidance was provided by OSD on modeling. In the analysis of labs, depots, test and evaluation, undergraduate pilot training, and medical installations, OSD used weighted multiple attribute decision models (D-Pad and an Air Force model) and a mixed-integer, linear program.

Adequacy of the D-Pad Model

Use of the D-Pad model was consistent with BRAC 1991 and BRAC 1993, and this provided model familiarity for the analysts, data providers, and leaders. OSD, GAO, and the BRAC Commission staff were also familiar with the model and its output. This consistency gave the Army instant credibility with D-Pad.

The D-Pad model uses simple additive weighting to decompose and solve a problem. This technique allows the user to break the problem down into smaller parts for analysis, then recombine them for the result. D-Pad produces mathematically correct solutions and is easy to use with little training. The model output can be readily explained.

The D-Pad model helped show the logical construction of the problem by displaying the attributes, weights, installations and rankings in a single output. It was efficient for the Army to use in BRAC 1995 because it required little new user training. It is currently available only in DOS format, but a Windows version is in development. The D-Pad model has been proven adequate in three previous BRAC rounds and is adequate for future base closure analysis.

Other Models That Could be Used

The ESSC report included a comparison of the D-Pad model with two other available models, Expert Choice[71] and TOPSIS (Technique for Ordered Preference by Similarity to the Ideal Solution). The ESSC report concluded that D-Pad is the best model based on its suitability and ease of use.[72] The capabilities of the three models have not changed since the ESSC study. A brief review of these models follows.

TOPSIS is a public domain software program that can solve problems with up to 10 alternatives. It has a very rudimentary user interface and provides no sensitivity analysis. Because some categories of have more than 10 installations, and user interface is important, TOPSIS is not considered a feasible model to use for future BRAC analysis.

Expert Choice uses a structured hierarchy to decompose the problem and ranks the alternatives by using pairwise comparisons. It is available on the commercial market in both Windows and DOS format. It has a good user interface and sensitivity analysis, and it is relatively easy to use. Expert Choice is equal to D-Pad in its ability to support the quantitative assessment and could be considered for use in future BRAC analysis; but until it proves to be advantageous to change, the Army's history of use and familiarity with D-Pad make it the preferred model.

Analysis of the Final Military Value Assessment

GAO said, "This Stationing Strategy formed the basis for military value assessments and was used to identify a list of installations to be studied closer for closure or realignment."[73]

This brings into focus a question about the soundness of this process. Although the IA consumed considerable resources and produced quantitative results, the qualitative analysis alone determined military value. Each installation was judged to be of high or low military value predominantly on the Army stationing strategy. The IA did assist in determining military value, as the quantitative information was used by the Army leadership to assess the installation inventory and get an idea of each installation's capabilities. However, it was never integrated into the determination of military value. Thus, the military value determination was a reflection of senior Army leadership opinions and not strongly linked to the four DoD selection criteria.

Picatinney Arsenal, New Jersey shows this lack of linkage. It was the second highest of nine commodity installations in the IA, but was judged low in military value because: "Its facilities are older and require substantial funds to renovate or replace. Without substantial investment, Picatinny lacks the infrastructure to support integrated life cycle functions."[74] This qualitative assessment (older facilities, lack of infrastructure) is in conflict with the IA's assessment of the same areas. Picatinny scored high in the IA, based on all of its attributes, and it compensated for the older facilities and limited infrastructure by scoring higher than average in other attributes. The military value assessment did not consider the areas in which Picatinny scored well.

The soundness of the final military value will be questionable if the rationale used by the Army in the Stationing Strategy and the operational blueprint is flawed.

Adequacy of the Final Military Value Assessment

The process of combining the IA and the Army stationing strategy was consistent across all installation categories. In every case where the IA and the Army stationing strategy conflicted, the stationing strategy prevailed. There is no case where the IA results alone determined the military value of the installation. The Army's process was conducted efficiently by keeping a small number of people involved and keeping them updated with briefings. The Army leadership made the key decisions; however, they did not provide a solid audit trail to the four DoD selection criteria that measure military value. The final military value judgment concerning Army its installations was inadequate.

The process should be improved to link the military value better to the four DoD selection criteria. If the Army stationing strategy is the basis for determining military value, then it should measure the DoD selection criteria. If the IA is not an integral part of the determination of military value, it should be discontinued.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Although the Army's overall process for military value assessment is not without flaw, it is generally adequate for use in future BRAC analysis. This thesis notes several areas where the process is inadequate, such as the development of goals and objectives and the development of attributes to assess the efficiency of installations.

The Army failed to develop and publish goals and objectives for its military value assessment. Without these goals, the military value assessment might not produce enough study candidates to support the infrastructure reduction required. The military value assessment must be linked to the reduction of infrastructure required.

The Army failed to provide an adequate assessment of the efficiency of its installations. The Army's quantitative assessment of installation efficiency is based on inaccurate and incomplete information about the base operation costs at the installation. These data must be refined prior to the next BRAC analysis.

Several other areas of the Army's military value assessment process should be improved before the next BRAC round. In these areas, the Army's process for military value analysis is

inconsistent, unsound, inefficient, or not logically constructed.

Table 5 summarizes the conclusions of this thesis.

TABLE 5. Summary of the Conclusions of the Thesis

Decision Element	Conclusion	Improvements Needed
Definition	Adequate	• None
Goals and Objectives	Not Adequate	• Army must set goals for military value analysis that correspond to infrastructure reduction required.
Selection of Installations	Adequate	• Army should review decisions regarding subinstallations.
Categorization of Installations	Adequate	• Army should develop attributes first, then place installations in categories that fit the attributes. • Army should eliminate lease and minor sites as categories. • Army should consider placing multi-purpose installations in a separate category.
Development of Attributes	Adequate	• Army should develop a measure of efficiency at installations to measure DoD selection criteria four adequately.
Data gathering	Adequate	• Army should develop and maintain standard data bases that contain information to support BRAC analysis to increase efficiency.
Modeling	Adequate	• None
Final determination of Military Value	Not Adequate	• Army must review the linkage between the stationing strategy and the first four DoD selection criteria.

Recommendations

Recommendations for Setting Goals and Objectives

The Army's future goals and objectives for the military value analysis must match OSD's, to ensure the BRAC military value effort is synchronized across the DoD. The goals and objectives for the military value assessment for both the Army and OSD must be published before the assessment process begins. For example, if OSD requires a 15 percent reduction in PRV, the Army should find at least 15 percent of its PRV as low in military value.

Recommendations for Selecting Installations for Study

The Army's selection of installations for study was adequate but could be improved for the major installations and the leased facilities. The Army's management decisions for the subinstallations to parent installation relationship should be changed for BRAC analysis. All installations should be studied if they meet the set criteria. Stand alone subinstallations, with installation commanders, should be considered separately in the military value analysis.

Recommendation for Determining Installation Categories

The process to categorize installations can be constructed more logically if its development is based on common attributes. After the category attributes are selected, installations that possess all of the attributes are considered part of that category. Multipurpose installations should be placed in a separate category. All minor sites and leases should be identified and studied for

military value in the same manner as other installations, by the same study team. This will enhance the analytic consistency.

Recommendations for Developing Attributes

The Army should develop attributes to measure the efficiency of operating an installation. The Army should develop a standard unit cost definition for base operations and support costs, then collect and monitor the unit cost data continuously.

Recommendations for Data Gathering

To improve the efficiency of data gathering, the Army should rely less on data calls and more on standard data bases. The Army should maintain a standard data base that contains all management information necessary to conduct BRAC analysis.

Recommendations for Modeling

The D-Pad model is recommended for use in future BRAC analysis, until another decision model is proven to be better.

Recommendations for the Final Determination of Military Value

The Army must more strongly link the Army stationing strategy to the first four DoD selection criteria more strongly. Since the stationing strategy is the primary influence to the military value determination, it must be clearly a measurement of the first four DoD selection criteria to comply with the 1991 BRAC Act.

A method to ensure this type of strong linkage is to form one study group (similar to TABS) to complete both the Army stationing strategy and the IA. This study group should document the Army leadership's qualitative judgments for the first four DoD selection

criteria and the specific considerations used to form the Army stationing strategy, creating a formal record of the major factors in the decision-making process.

Recommendations for Further Study

Extensions of This Thesis

This thesis analyzes only the process used to measure the first four DoD selection criteria. A companion thesis could investigate the Army's process to assess the other four DoD selection criteria, particularly the COBRA model. This model provides key input to the decision process as it predicts costs and savings associated with the closure or the realignment. The Army accepted or rejected recommendations to close installations of low military value based on these cost and savings impacts. Therefore, the costs analysis played a key role in the BRAC process.

Other Related Topics

The next BRAC round will be more joint oriented than previous BRACs, because economies of scale warrant combination of like installations. A thesis similar to this one, that analyzes the military value processes for the Navy and the Air Force would be useful in contrasting the methods used by each service.

An analysis of how this joint analysis is to be performed is a good topic to investigate before the next BRAC round. The analysis should look at: (1) the categories of installations that should be studied at the OSD level; (2) the analytical tools that should be used; (3) data elements that should be defined in common across DoD;

(3) the manner in which data should be collected; and, (4) the way the study effort should be organized at OSD level.

ENDNOTES

Chapter 1

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APPENDIX A

KEY TERMS

Attributes. Specific data elements collected from each installation as part of the military value analysis process. These data elements are selected and defined to provide a measurement of the installation's value to the Army.

BRAC Act. Base Realignment and Closure Act of 1991 as amended. Summary of the BRAC Act: The National Defense Authorization Act for Fiscal Year 1991 (Title XXIX of Public Law 101-510) established procedures for closing or realigning installations inside the United States. The Act established an independent Defense Base Closure and Realignment Commission. The Commission reviews the recommendations of the Secretary of Defense during calendar years 1991, 1993, and 1995. The Commission did not meet in 1992 or 1994.

BRAC threshold. The BRAC Act applied to any closure of an installation which employs at least 300 civilian direct hire, full-time employees. The Act also applied to any realignment of an installation employing 300 or more employees -- if the reduction was more than 1,000 employees or if the reduction was more than 50 percent of the total number of civilian employees. Reductions-in-force resulting from workload reductions, reduced personnel or funding levels, skill imbalances or similar causes are excluded from mandatory coverage. The Act does not affect the authority of the Secretary to execute base closures and realignments mandated by

Public Law 100-526 (1988 Commission), closures outside of the United States, or proposals that do not exceed the thresholds outlined above. The legislation does not affect the execution of base closure initiatives mandated under Public Law 100-526, closures outside of the United States, or proposals that do not exceed the thresholds outlined above. The National Defense Authorization Act for Fiscal Years 1992 through 1994 (Section 2821) contains several amendments to the original Act.

BRAC Rounds. A BRAC Round is the analysis associated with a specific BRAC year or number. The 1988 Commission is called BRAC I, the 1989 Commission is called BRAC II, and all overseas closures and realignments are called BRAC III. There were three BRAC rounds conducted under the BRAC Act - BRAC 91, BRAC 93 and BRAC 95.

Capacity Analysis. The analysis of the how much support infrastructure is available within a given type of installation set.

COBRA Model. Cost of Base Realignment Actions (COBRA) model. This is a model used by the Department of Defense to predict the costs and savings generated by a base closure or realignment.

Commission. The Defense Base Closure and Realignment Commission. The commission consists of a chairman and six commissioners, appointed by the President. The mission of this group is to review the Department of Defense's BRAC recommendations and provide recommendations to the President.

Close. All missions of the base will cease or be relocated. All personnel will either be eliminated or relocated.

Decision Pad (D-PAD) Model. A commercial software program produced by Apian Software, Inc., of Menlo Park, CA. This software was used in BRAC 91, 93 and 95 by the Army to compare installations.

Force Structure. A list of major units in the Army inventory. A force structure document is prepared by each Military Department prior to each BRAC round.

Installation. BRAC definition: a base, camp, post, station, yard, center, homeport facility for any ship, or other activity under the jurisdiction of the Department of Defense, including any leased facility. Such term does not apply to any facility used primarily for civil works, rivers and harbors projects, flood control, or other projects not under the primary jurisdiction and control of the Department of Defense.

Installation Assessment. A quantitative assessment of an installation's capabilities. This term was used in BRAC 1995 only. It replaced the Military Value Assessment from previous BRAC rounds.

Installation Categories. For the purpose of comparison and analysis, the Army grouped like installations together. These groups of installations are called installation categories.

Military Value. An assessment regarding the value of an installation to the Army. The 1991 BRAC Act describes four criteria to measure Military Value (these differ from the BRAC 1988 criteria):

1. The current and future mission requirements and the impact on operational readiness of the Department of Defense's total force. (Mission Requirements)

2. The availability and condition of land, facilities and associated airspace at both the existing and potential receiving locations. (Land and Facilities)

3. The ability to accommodate contingency, mobilization, and future total force requirements at both existing and potential receiving locations. (Future Missions)

4. The cost and manpower implications. (Cost and Manpower)

Operational Requirements. A qualitative assessment by the Army leadership regarding the strategic value and uniqueness of a certain category of installations. Operational requirements form the basis of the operational blueprint.

Operational Blueprint. The list of critical operational requirements relating to stationing forces within a specific category of installations.

Realign/Realignment. Some missions of the base will cease or be relocated, but others will remain. The base is being realigned if itwill experience a net decrease in DoD civilian personnel.

Selection Criteria. A list of eight considerations produced by the Department of Defense which all BRAC recommendations must address. Criteria 1-4 address military value and are defined above. The last four criteria are:

5. The extent and timing of potential costs and savings, including the number of years, beginning with the data of closure or realignment, for the savings to exceed the costs. (Return on Investment)

6. The economic impact on communities. (Economic Impact)

7. The ability of both the existing and potential receiving communities' infrastructure to support forces, missions and personnel. (Community Impact)

8. The environmental impact. (Environmental Impact)

Stationing Strategy. A document produced by the Army that details how the Army assigns units to the geographic locations.

TABS. Total Army Basing Study (1991, 1993), The Army Basing Study (1995). This office was the Army's analytical study team for BRAC recommendations. They produced the Army's BRAC recommendations.

APPENDIX B

ARMY BASE REALIGNMENTS AND CLOSURES WITHIN THE U.S. SINCE 1988

1. BRAC I - 1988 Commission

CLOSURES

Major Installations
Fort Meade, MD (partial)

Minor Installations
Jefferson Proving Ground, IN
Lexington Army Depot, KY
Army Materials Technology Laboratory, MA
Fort Sheridan, IL
Presidio of San Francisco, CA
Cameron Station, VA

Other
Alabama Army Ammunition Plant
Fort Wingate Ammunition Storage Depot, NM
Fort Douglas, UT
Hamilton Army Airfield, CA
New Orleans Military Ocean Terminal, LA
Kapalama Military Reservation, HI
Coosa River Storage Annex, AL
Navajo Depot, AZ
Pontiac Storage Facility, MI
53 stand-alone housing sites
8 miscellaneous properties
- Tacony Warehouse, PA
- NIKE site Kansas City, MO
- Cape St George, FL
- Defense Mapping Agency site, Herndon, VA
- Bennett Army National Guard Facility, CO
- Army Reserve Center, Gaithersburg, MD
- Fort Des Moines, IA (partial)
- Indiana Army Ammunition Plant, IN

BRAC I REALIGNMENTS

Losers:
Fort Dix, NJ
Fort Holabird, MD
Pueblo Army Depot, CO (eventual closure)
Umatilla Army Depot, OR (eventual closure)
Fort Bliss, TX

BRAC I REALIGNMENTS

Losers and Gainers:

Fort Leanord Wood, MO
Fort Jackson, SC
Fort Ben Harrison, IN
Fort Devens, MA
Fort Hauchuca, AZ
Fort Belvoir, VA
Fort Monmouth, NJ
Fort Gordon, GA
Fort Drum, NY
Los Alimitos AFRC, CA
Sacramento AD, CA
Fort Leavenworth, KS
Fort Knox, KY
Fort Sill, OK
Fort Shafter, HI
Fort Benning, GA
Fort Campbell, KY
White Sands Missile Range, NM
Harry Diamond Labs, MD
Savanna Army Depot, IL
Camp Parks, CA
Bluegrass Army Depot, KY
Hawthorne AAP, NV
Fort Irwin, CA
Aberdeen Proving Grounds, MD
Fort Indiantown Gap, PA
Fort A.P. Hill, VA
Natick RDEC, MA

Gainers:

Fort Lee, VA
Fort Carson, CO
Fort Detrick, MD
Tobyhanna Depot, Pa
Redstone Arsenal, AL
Letterkenny Depot, PA
Detroit Arsenal, MI
Picatinny Arsenal, NJ
Yuma Proving Grounds, AZ
Tooele Depot, UT
Red River Depot, TX
Anniston Depot, AL
Sierra Depot, CA
Schofield Barracks, HI
Fort Lewis, WA
Fort Myer, VA
Fort McNair, VA
Fort McCoy, WI
Fort Ord, CA
Oakland Army Base, CA
Walter Reed AMC, DC
Fort Bragg, NC
Fitzsimons AMC, CO

2. BRAC II - 1990 DoD Announcements

BRAC II LAYAWAYS (INACTIVATIONS to caretaker status)

Major
Indiana Army Ammunition Plant, IN
Louisiana Army Ammunition Plant, LA

Minor
Kansas Army Ammunition Plant, KS
Longhorn Army Ammunition Plant, TX
Mississippi Army Ammunition Plant, MS
Scranton Army Ammunition Plant, PA
Sunflower Army Ammunition Plant, OK

3. BRAC 91 - 1991 Commission

CLOSURES Major Installations
Fort Benjamin Harrison, IN
Fort Devens, MA
Fort Ord, CA
Sacramento Army Depot, CA

Other
Woodbridge Research Facility, VA

REALIGNMENTS
Aviation Systems Command/Troop Support Command, MO
Fort Chaffee, AR
Fort Dix, NJ
Fort Polk, LA
Letterkenny Army Depot, PA
Rock Island Arsenal, IL
10 RDT&E Laboratories
7 Medical Laboratories

4. BRAC 93 - 1993 Commission

CLOSURE Vint Hill Farms Station, VA

BRAC 93 REALIGNMENTS

Tooele Depot, UT
Fort Monmouth, NJ
Fort Belvoir, VA
Letterkenny Army Depot

CHANGES TO PREVIOUS BRACs

HQ 6th U.S. Army remains at Presidio of San Francisco, CA
SIMA-E remains at Letterkenny Depot, PA
AMCCOM remains at Rock Island, IL

5. BRAC 95 - 95 Commission

CLOSURES

Major Installations

Aviation-Troop Command, MO
Bayonne Military Ocean Terminal, NJ
Fitzsimons Army Medical Center, CO
Fort Chaffee, AR
Fort Indiantown Gap, PA
Fort McClellan, AL
Fort Pickett, VA
Fort Ritchie, MD
Fort Totten, NY
Price Support Center, IL
Red River Army Depot, TX
Savanna Army Depot Activity, IL
Selfridge Army Garrison, MI
Seneca Army Depot, NY
Stratford Army Engine Plant, CT

Minor Installations

Bellmore Logistics Activity, NY
Big Coppett Key, FL
Branch U.S. Disciplinary Barracks, Lompoc, CA
Camp Bonneville, WA
Camp Kilmer, NJ
Camp Pedricktown, NJ
Caven Point Army Reserve Center, NJ
East Fort Baker, CA
Fort Missoula, MT
Hingham Cohasset, MA
Information Systems Software Command, VA
Publications Distribution Center Baltimore, MD
Recreation Center #2, NC
Rio Vista Army Reserve Center, CA
Sudbury Training Annex, MA

BRAC 95 REALIGNMETS

Fort Buchanan, Puerto Rico
Detroit Arsenal, MI
Fort Greely, AK
Fort Hamilton, NY
Fort Hunter Liggett, CA
Kelly Support Center, PA
Letterkenny Army Depot, PA
Sierra Army Depot, CA
Fort Dix, NJ
Fort Lee, VA
Fort Meade, MD

BRAC 95 CHANGE TO PREVIOUS BRACs

Tri-Service Project Reliance

APPENDIX C

BRAC 95 INSTALLATIONS AND CATEGORIES

1. Maneuver Installations. Maneuver installations provide the facilities and resources to house, sustain, maintain, train, and deploy major Active Component (AC) force units. In addition, these installations provide training and mobilization support to Reserve Component (RC) force units. BRAC 95 Maneuver Installations:

Fort Bragg, NC
Fort Campbell, KY
Fort Carson, CO
Fort Drum, NY
Fort Hood, TX
Fort Lewis, WA
Fort Richardson, AK
Fort Riley, KS
Fort Stewart, GA
Fort Wainwright, AK
Schofield Barracks, HI

2. Major Training Areas. Major Training Areas provide facilities to Active and Reserve Components for large unit training exercises. These installations vary a great deal in characteristics, capabilities, and organizational structure. Fort Irwin, home of the National Training Center, is a very large and sophisticated training area which is predominately AC oriented. Fort Indiantown Gap is a relatively small sub-installation with an RC orientation. The majority of the training supported by this category is performed by the RC. BRAC 95 Major Training Areas:

Fort A.P. Hill, VA
Fort Chaffee, AR
Fort Dix, NJ
Fort Greely, AK
Fort Hunter-Liggett, CA
Fort Indiantown Gap, PA
Fort Irwin, CA
Fort McCoy, WI
Fort Pickett, VA
Fort Polk, LA

3. Command and Control/ Administrative Support. U.S. Army Command and Control and Administrative Support installations provide

facilities through which the Army leadership commands, controls, and manages the Army. They house primarily, but not exclusively, non-deployable headquarters and activities which oversee day to day functions of the Army. The BRAC 93 category of Command and Control was redefined as Command and Control/Admin Support Installations for BRAC 95. This change was necessary to accommodate installations that have a primary mission of administrative support. BRAC 95 Command and Control Installations:

Fort Belvoir, VA
Fort Buchanan, PR
Fort Gillem, GA
Fort Hamilton, NY
Fort McPherson, GA
Fort Meade, MD
Fort Monroe, VA
Fort Myer, VA
Fort Ritchie, MD
Fort Shafter, HI
Fort Totten, NY
C. Kelly Support Center, PA
C. M. Price Support Center, IL
Presidio of San Francisco, CA
U.S. Army Garrison, Selfridge, MI

4. Training Schools. Training schools provide the Army with trained individual soldiers. The training mission includes entry level and advanced training for enlisted soldiers and officers. This category was renamed from INITIAL ENTRY/BRANCH SCHOOLS (BRAC 93) to TRAINING SCHOOLS (BRAC 95) to better describe the mission of the installation versus the tenant. The Presidio of Monterey was moved from the PROFESSIONAL SCHOOLS (BRAC 93) category based on its primary mission of training. BRAC 95 Training Schools:

Fort Benning, GA
Fort Knox, KY
Fort Leonard Wood, MO
Fort Eustis/Story, VA
Fort Lee, VA
Fort Rucker, AL
Fort Huachuca, AZ
Presidio of Monterey, CA
Fort Jackson, SC
Fort Sill, OK
Fort McClellan, AL
Fort Gordon, GA
Fort Bliss, TX
Fort Sam Houston, TX

5. Professional Education. The Professional Schools have the mission of providing the Army with trained leaders, developing doctrine, defining the Army's material requirements, designing the

Army's organizations and developing the Army's leaders. The training mission includes career professional training for the NCO and officer corps, and training Department of the Army civilians. BRAC 95 Professional Education Installations:

Carlisle Barracks, PA	Fort Lesley J. McNair, DC
Fort Leavenworth, KS	West Point, NY

6. Ammunition Production. Ammunition production facilities manufacture, receive, store, renovate, test, and demilitarize conventional and chemical ammunition. They operate calibration laboratories and ballistic test facilities. They also provide Quality Assurance Specialist Ammunition Surveillance (QASAS)/depot storage for ammunition. BRAC 95 Ammunition Production Installations:

Holston AAP, TN	McAlester AAP, OK
Iowa AAP, IA	Pine Bluff Arsenal, AR
Lake City AAP, MO	Radford AAP, VA
Lone Star AAP, TX	Milan AAP, TN

7. Ammunition Storage Installations. Ammunition storage installations receive, store, maintain, demilitarize, and dispose of conventional and special ammunition and other commodities. Ammunition storage installations were part of the DEPOT and PRODUCTION categories in 1993. An improved evaluation of these installations is possible by separating them from maintenance depots. BRAC 95 Ammunition Storage Installations:

Blue Grass Army Depot, KY	Seneca Depot, NY
Hawthorne Army Ammo Plant, NV	Sierra Depot, CA
Pueblo Depot, CO	Tooele Depot, UT
Savanna Depot, IL	Umatilla Depot, OR

8. Commodity Installations. Commodity installations are industrial facilities which include laboratories, engineering and logistical management center, National Inventory Control Points (NICP) and National Maintenance Points (NMP). They collectively determine the Army's requirement, procure or overhaul necessary assets, position equipment in the appropriate depots, and issue in response to the Army's needs. They meld both the private and public industrial base in support of the Army and Department of Defense Program Managers. BRAC 95 Commodity Installations:

Army Research Laboratory, MD
Cold Region Research Lab, NH
Detroit Arsenal, IL
Fort Detrick, MD
Redstone Arsenal, AL
Fort Monmouth, NJ
Natick Research Ctr, MA
Picatinny Arsenal, NJ
Rock Island Arsenal, IL

9. Ports. Ports are industrial facilities that include ocean terminals and an ammunition terminal operated by the Military Traffic Management Command (MTMC). BRAC 95 Ports:

Bayonne Military Ocean Terminal, NJ
Oakland Military Ocean Terminal, CA
Sunny Point Military Ocean Terminal, NC

10. Depots. Maintenance depots receive, store, issue and maintain both ammunition and assorted items of Army equipment. The ammunition storage depots were given their own category in BRAC 95, allowing comparison of the maintenance depots by themselves. BRAC 95 Depots:

Anniston Depot, AL
Letterkenny Depot, PA
Red River Depot, TX
Tobyhanna Depot, PA

11. Proving Grounds. Proving Grounds are facilities that include laboratories, engineering and logistical management centers, and inventory control centers. Proving Grounds plan, conduct, and report the results of developmental tests of chemical warfare

munitions, chemical and biological defense systems and flame, incendiary, smoke obscurant and illuminating weapons systems. The proving ground safeguards, stores, transports, and uses chemical surety materiel, and provides security and removal/disposal of unwanted chemical surety materiel. BRAC 95 Proving Grounds:

Aberdeen Proving Grounds, MD
Dugway Proving Grounds, UT
Yuma Proving Grounds, AZ
White Sands Missile Range, NM

12. Medical Centers. Medical Centers provide patient care, graduate medical education, and medical research. Patient care ranges from simple outpatient treatment to sophisticated specialty care and includes referral care from other facilities. Graduate medical education provides military-oriented graduate medical training and is essential to the recruitment and retention of military physicians. In prior years, Tripler Army Medical Center was included in Fort Shafter's installation assessment. BRAC 95 Medical Centers:

Fitsimons Medical Center, CO
Tripler Medical Center, HI
Walter Reed Medical Center, DC

13. Industrial Facilities. Industrial facilities are initial production manufacturing plants that receive, store, and incorporate raw materials and sub-components into the manufacturing process for end-items and components. Industrial facilities can be either government owned - government operated (GOGO) or government owned - contractor operated (GOCO). BRAC 95 Industrial Facilities:

Lima Tank Plant, OH
Stratford Eng Plant, CT
Watervliet Arsenal, NY

14. BRAC 95 Lease Study Candidates:

Army Concepts Analysis Agency, MD
Army Space Cmd, CO
HQ, Army Personnel Cmd, VA
Crystal City, VA
Judge Advocate General School, VA
Army Personnel Center, MO
HQ, Space and Strategic Defense Cmd, AL
Crown Ridge, VA
HQ, Aviation Troop Cmd, MO
Bailey's Crossroads, VA
National Ground Intelligence Center, VA
Army Research Office, NC
Military Traffic Management Cmd, VA
HQ, Army Materiel Cmd, VA
Army Operational Test and Evaluation Cmd, VA

15. Minor sites for BRAC 95:

Baltimore Publications Center, MD
East Fort Baker, CA
Rio Vista Army Reserve Center, CA
Camp Pedricktown, NJ
Bellmore Logistics Activity, NY
Camp Kilmer, NJ
Valley Grove Maintenance Activity, VW
Fort Missoula, MT
Fort Stevens Cemetery, OR
Big Coppet Key, FL
Bothell Army Reserve Center, WA
Camp Bonneville, WA
Defense Support Activity Boston, MA
Hingham Cohasset, MA
Sudbury Training Annex, MA
Recreation Center 2, NC
U.S. Disciplinary Barracks, Lompoc, CA
Fort Worden Cemetery, WA
Ravenna Army Ammunition Plant, OH
Caven Point, NJ

APPENDIX D

BRAC 95 ATTRIBUTE DEFINITIONS

1. ACCESSIBILITY

a. DEFINITION: The accessibility of an installation as measured by calculating the number of miles to the four most "traveled to" destinations from that installation, one of which must be the installation's next higher headquarters.

b. PURPOSE: To assess how well located an installation is to perform its command, control, and management functions.

c. METHODOLOGY: The average distance in miles from the installation to its four most "traveled to" locations, one of which must be the installation's higher headquarters, will be calculated using actual travel data for FY 93.

2. AMMUNITION STORAGE

a. DEFINITION: Ammunition storage capability measured square feet.

b. PURPOSE: A measure of an installation's capability to store and handle and ammunition.

c. METHODOLOGY: Assets are determined by summing the permanent square footage from Facility Category Groups 4110, 42100 and 42200.

3. APPLIED INSTRUCTIONAL FACILITIES

a. DEFINITION: Total square footage of permanent and specialized training and instructional facilities on the installation.

b. PURPOSE: Indicates special purpose facilities used for training and instruction. Special purpose facilities represent a significant cost investment to the military. Relocation of elements requiring special purpose facilities would cause significant expenditure of MCA funds and would require more time to complete realignment.

c. METHODOLOGY: Summation of the square footage of special applied instructional facilities. FCGs: 17130 (Applied Instructional Building). New construction projects in the FY 91 - FY 95 Military Construction Program are counted as existing assets.

4. AVAILABLE WORK FORCE

a. DEFINITION: Available workforce density of the surrounding area around the installation.

b. PURPOSE: This is an indirect measure of availability of an adequate workforce in the surrounding community. Representative area is the area identified as the Region of Influence by the BRAC Economic Impact model (This area is generally the county or counties surrounding the installation or the Metropolitan Statistical Area (MSA)).

c. METHODOLOGY: This is an indirect measure of the availability of an adequate civilian workforce.

5. AVERAGE AGE OF FACILITIES

a. DEFINITION: Average age of all existing facilities on the installation.

b. PURPOSE: Average facility age is an indicator of the overall quality and condition of the facilities on the installation.

c. METHODOLOGY: Historical data of construction completion dates used to calculate the age of all permanent facilities on the installation.

6. BARRACKS (Unaccompanied Personnel Housing)

a. DEFINITION: Total number of permanent on post spaces available for unaccompanied officers and enlisted personnel.

b. PURPOSE: To determine the availability of adequate UOPH and UEPH at the installation. Measures the total unaccompanied officer personnel housing (UOPH) and unaccompanied enlisted personnel housing (UEPH) spaces available on the installation.

c. METHODOLOGY: Summation of the total number of permanent unaccompanied officer housing spaces available on the installation. The FCG is 72400. Unaccompanied Enlisted Personnel Housing (UEPH) is measured by the total number of permanent enlisted member housing spaces on the installation. On-post available spaces are measured at no more than two persons per room at 90 NET square feet per person. The FCG is 7210S. UEPH also includes trainee assets. The FCG is 7218P. New construction projects in the FY 91 - FY 95 Military Construction or Army Family Housing Program are counted as existing assets.

7. BARRACKS(UPH) AND FAMILY HOUSING

a. DEFINITION: Number of permanent, adequate barracks and family dwelling units (on and off-post).

b. PURPOSE: To measure the total availability of living quarters for unaccompanied officer, permanent party enlisted personnel, married/single parent soldiers and their families.

c. METHODOLOGY: Army Family Housing (AFH) information is obtained from the installations' segmented housing market analysis and adjusted with FY 90 Census and local installation data, DD Form 1523, Military Family Housing Justification, and DD 1410 Family Housing Inventory and Occupancy Report (validated by DAIM-FDH-M) by using HQRPLANS. Family housing assets in HQRPLANS include both government controlled assets and the installation's expected share of local economy assets. FCGs for family dwelling units are 7110F for on-post and (TBD) for off-post.

Unaccompanied Officer Personnel Housing (UOPH) is measured by the total number of permanent unaccompanied officer housing spaces available on the installation. The FCG is 72400.

Unaccompanied Enlisted Personnel Housing (UEPH) is measured by the total number of permanent enlisted member housing spaces on the installation. On-post available spaces are measured at no more than two persons per room at 90 NET square feet per person . The FCG is 7210S. UEPH also includes trainee assets. The FCG is 7218P. New barracks and AFH construction projects in the FY 91 - FY 95 Military Construction Program are counted as existing spaces on the installation.

8. BASOPS/MISSION POPULATION

a. DEFINITION: Measure of the base operations (BASOPS) cost required to support mission population.

b. PURPOSE: To measure the relative cost of operating an installation in support of the mission requirements. This provides a relative cost factor used to assess the relative cost of operations of an installation.

c. METHODOLOGY: Report total Base Support cost data (RPMA payroll, RPMA Non-payroll, Base Communication Costs, BASOPS Payroll/Non-payroll) for each installation. Data provided should include all known costs paid for operation and support including reimbursable and RDTE. The total mission population supported is obtained from the Base Operations Support Mission Model (BOSMM) supported by USAFISA. Additionally, any government workspace provided to mission contractors will be included (do not include contractors providing base support functions).

9. BUILDABLE ACRES

a. DEFINITION: This measures the ability of the installation to expand within its current property line in accordance with accepted master planning policy and guidance as reflected on the long range component of the approved installation master plan. The result is the total acreage available for construction of additional facilities on the installation.

b. PURPOSE: Measure the installation's capacity to support additional permanent structures.

c. METHODOLOGY: (1) In accordance with the long range component of the installation master plan, identify areas compatible with new development, such as areas zoned for Administration, housing, industrial, maintenance, supply or storage, or community facilities, that are not currently filled with permanent facilities. Areas such as maneuver/training ranges, impact areas, safety fan areas, required buffer areas, and environmentally sensitive areas will not be considered for expansion construction under this methodology. (2) Measure the total number of available acres which then could be used for locating permanent new mission structures. Areas lacking current utility support or where there are under-utilized or un-utilized wood facilities should be considered for expansion construction. Exclude acreage to be used for construction through FY95.

10. CAPACITY - MAINTENANCE

a. DEFINITION: The amount of workload, expressed in direct labor hours, that a facility can accommodate with all work positions manned on a single-shift, 5-day, 40-hour week basis while producing the product mix that the facility is designed to accommodate.

b. PURPOSE: To measure the available maintenance capacity at the installation.

c. METHODOLOGY: Maximum Number of Available Maintenance Workstations X 1615 Productive Hours X 95 percent of the Total Hours(Availability Factor)= Total Direct Labor Hours Available

11. CAPACITY - PRODUCTION

a. DEFINITION: The amount of workload, expressed in actual direct labor hours, that a facility can accommodate with all work positions manned on a single-shift, 5-day, 40-hour week basis while producing the product mix that the facility is designed to accommodate.

b. PURPOSE: To measure the available production capacity at the installation.

c. METHODOLOGY: Maximum Number of Available Production Line Workstations X 1615 Productive Hours X 95 percent of the Total Hours(Availability Factor) = Total Direct Labor Hours Available1

12. CAPACITY - SUPPLY

a. DEFINITION: The square footage of warehouse space for the storage of items other than ammunition and bulk fuel.

b. PURPOSE: To measure the warehouse storage capacity of the installation.

c. METHODOLOGY: Rating is based on data obtained from referenced management report for general purpose warehouses, both heated and unheated. The extracted data is listed as warehouse total, net space total.

13. COST OF LIVING INDEX

a. DEFINITION: Measure the relative cost of living at each installation.

b. PURPOSE: To measure the relative cost of living for military and civilian personnel in communities surrounding the installation. This is an indicator of location costs to the Army to live and conduct business at the installation.

c. METHODOLOGY: Used the information from the American Chamber of Commerce Research Association (ACCRA) Cost of Living Index for 1993. The index measures the relative price levels for consumer goods and services based on local community input. The cost index is selected directly from the table if installation is located within a 50 mile radius of the Metropolitan Statistical Areas (MSAs), Primary Metropolitan Statistical Areas (PMSAs) or Non-metropolitan Areas as defined by the Office of Management and Budget on December 28, 1992. In cases were the installation is not included in the ACCRA report, a linear relationship will be used to predict the COL Index using the VHA factor.

14. DEPLOYMENT NETWORK

a. DEFINITION: The distance from installation to its critical deployment structure: airfields, ports, railheads and interstate highways.

b. PURPOSE: To evaluate installation's capability to support deployments, which is an important element in projecting land forces to locations outside the United States.

c. METHODOLOGY: The distances (in miles) from installation to interstate highway, railhead, C-141/747 capable airport and Ocean vessel capable seaport. A Decision Pad submodel is used giving each factor the following weights:

Distance to Facility	Points
Railhead	30
Airport	30
Seaport	30
Highway	10
Total	100

15. ENCROACHMENT

a. DEFINITION: Population density of the surrounding area to the installation.

b. PURPOSE: This is a measure of encroachment on the installation as a function of population density (population/square mile).

c. METHODOLOGY: Weighted Average of population density of the Region of Influence as identified by the BRAC Economic Impact model (This area is generally the county or counties surrounding the installation or the Metropolitan Statistical Area (MSA)). The rationale is the lower the population density around the post, the easier it will be to expand mission activity without impacting the surrounding community.

16. ENVIRONMENTAL CARRYING CAPACITY

a. DEFINITION: Composite consideration of various environmental factors.

b. PURPOSE: Measure the ability of the Army to conduct current missions, receive additional units and expand operations in light of environmental constraints.

c. METHODOLOGY: This is a measure of the following aspects of environmental carrying capacity:

FACTOR	WEIGHT
Archaeology & Historic Buildings	5
Endangered Species	15
Wetlands	15
Air Quality	10
Water Quality	15
Noise Quality:	
Zone II off post	10
Zone III off post	15
Contaminated Sites	15
Total	100

17. EXCESS CAPACITY - MAINTENANCE

a. DEFINITION: Maintenance plant capacity that is excess to utilized and surge requirements expressed in thousands of square feet.

b. PURPOSE: To measure the maintenance capacity in square feet that is currently available for expansion at an installation. Excess Capacity is a direct measurement of the expandability of the installation. It provides value for mobilization as well as the capability to receive additional missions.

c. METHODOLOGY: Total maintenance square feet minus utilized square feet (200 series EEA facilities) at an installation.

18. EXCESS CAPACITY - PRODUCTION

a. DEFINITION: Industrial Production plant capacity that is excess to utilized and surge requirements expressed in production facility square feet.

b. PURPOSE: To measure the production capacity in square feet that is currently unused at an installation.

c. METHODOLOGY: Excess Capacity is a direct measurement of the expandability of the installation. It provides value for mobilization as well as the capability to receive additional missions.

19. EXCESS CAPACITY - STORAGE

a. DEFINITION: Total unused square footage of warehouse space for the storage of items other than ammunition and bulk fuel.

b. PURPOSE: To measure the warehouse capacity that is currently unused at an installation. Indicates the capability of an installation to expand supply support in support of surge/mobilization.

c. METHODOLOGY: Summation of the square footage based on data obtained from referenced management report for general purpose warehouses, both heated and unheated. Utilized storage space is subtracted from the total to provide a vacant bulk, warehouse total.

20. FAMILY HOUSING

a. DEFINITION: Number of permanent, adequate family dwelling units (on and off-post).

b. PURPOSE: To measure the total availability of living quarters for married/single parent soldiers and their families.

c. METHODOLOGY: Family Housing (AFH) information is obtained from the installations' segmented housing market analysis and adjusted with FY 90 Census and local installation data, DD Form 1523, Military Family Housing Justification, and DD 1410 Family Housing Inventory and Occupancy Report (validated by DAIM-FDH-M) by using HQRPLANS. Family housing assets in HQRPLANS include both government controlled assets and the installation's expected share of local economy assets. FCGs for family dwelling units are 7110F for on-post and (TBD) for off-post. AFH construction projects in the FY 91 - FY 95 Military Construction Program are counted as existing spaces on the installation.

21. FAMILY HOUSING COST PER DWELLING UNIT (DU)

a. DEFINITION: Measure of the cost to maintain one set of family quarters at each installation.

b. PURPOSE: This attribute compliments the VHA Attribute. Together they provide an assessment of relative cost for housing a family at the installation.

c. METHODOLOGY: Number of on-post housing units as reported in HQRPLANS (March 1994). Cost information provided by the STANFINS 218 Report. Values generated by dividing an installation's average AFH Operations (AFHO) costs for three fiscal years (91,92,93) by the number of AFH units.

22. GENERAL INSTRUCTIONAL FACILITIES

a. DEFINITION: Total square footage of permanent general training and instructional facilities on the installation.

b. PURPOSE: Measure the in-place capability of the installation to conduct training by considering general purpose training facilities available.

c. METHODOLOGY: Summation of the square footage of all general purpose training facilities. Facility Category Group: 17120 (General Instructional Building) New construction projects in the FY 91 - FY 95 Military Construction Program are counted as existing assets.

23. HEALTH CARE INDEX

a. DEFINITION: Capitation Cost per Beneficiary (CCB) is the per capita funding a medical treatment facility (MTF) requires to provide all necessary medical care to the beneficiary population served by the MTF. This is not a measure of quantity of services delivered or MTF capacity.

b. PURPOSE: This is a measure of the effective use of health care dollars on a capitation basis. All future MTF funding will be capitation based.

c. METHODOLOGY: The following is a general methodology. For each MTF: Compute total direct and reimbursable health care cost then divide by the Total Beneficiary Population. The calculated score for each facility is assigned a rank order.

24. IMPACT ACRES

a. DEFINITION: Measures the size and capability of the land used for range impact area by the installation.

b. PURPOSE: This is an indication of the installation's range capacity to support the conduct of weapons familiarization, qualification, crew gunnery, and combined arms live fire training. The larger and more capable impact areas provide more range capacity on the installation.

c. METHODOLOGY: Impact areas are evaluated using a D-Pad submodel measuring and ranking the following for each post: number of impact acres, ability to conduct a Joint Air Attack Team exercise, and the ability of the installation's ranges to support firing the MLRS with training munitions.

25. INFORMATION MISSION AREA (IMA)

a. DEFINITION: Evaluation of existing IMA systems. The IMA systems to be evaluated are common user Telephone Switching System, Outside Cable Plant, Computers, Telecommunications Center (TCC), Local Area Network (LAN), Defense Data Network (DDN) Node, Video Teleconference (VTC).

b. PURPOSE: Evaluate IMA systems on the basis of available capacity, capability for expansion, and technology utilized.

c. METHODOLOGY: Utilized a questionnaire completed by the Installation Director of Information Management.

26. INFRASTRUCTURE

a. DEFINITION: Capacity of water, sewage treatment, electrical distribution and cost of land fill.

b. PURPOSE: To measure the infrastructure capacity of the installation.

c. METHODOLOGY: Four aspects are considered:

(1) Water: Capacity in terms of million gallons per day.

(2) Sewage treatment: Capacity in terms of million gallons per day.

(3) Electrical distribution: Capacity in terms of million kilowatt hours.

(4) Land fill: Cost of land fill used by the installation in dollars per short ton (on or off post), determined based upon historical records. *Measures a,b,c should incorporate any new infrastructure capacity resulting from projects included in the FY 91 - FY 95 military construction program.*

27. INSTALLATION AND BASE OPERATING EXPENSE (IBOE)

a. DEFINITION: IBOE is a measure of the BASOPS support required for execution of an installation's base support mission.

b. PURPOSE: To measure the overall economic indicator concerning the long-term BASOPS operational cost to retain an installation. This is one of a series of factors used to assess the relative cost of operation of an installation.

c. METHODOLOGY: Under the Defense Business Operations Fund (DBOF), cost accrual accounting systems are required to produce the actual cost of the product to the customer. This factor is an identifiable cost associated with the production/maintenance facility DBOF stabilized rate used to bill costs to DBOF customers.

28. LOCALITY PAY FACTOR

a. DEFINITION: The relative differences in cost of civilian work force at each installation.

b. PURPOSE: To measure the relative cost of labor -- not cost of living -- from one geographical area to another. This is a measure of the relative cost of labor to the Army at the installation.

c. METHODOLOGY: Used the Locality-Based Comparability Payments for General Schedule employees. In high cost areas (NYC, San Francisco, Los Angeles) the index used will be 1.08 as established by the Federal Employees Pay Comparability Act of 1990. 1.08 index will also be used for Hawaii and Alaska since these areas receive COLA and not a locality pay amount.

29. MAINTENANCE FACILITIES

a. DEFINITION: Maintenance facilities are defined as the total permanent square footage of maintenance (aviation and vehicle) facilities on the installation.

b. PURPOSE: To measure the installation capacity for providing permanent maintenance facilities. This is a measure used to assess the relative capability and suitability of the installation's facilities to support forces.

c. METHODOLOGY: Summation of the total number of permanent square feet of maintenance facilities for the Essential Elements of Analysis (EEA) and Facility Category Groups (FCG) shown below:

EEA	EEA DESCRIPTION	FCG	FCG DESCRIPTION
210	AVIATION MAINT	21110	MNT HANGAR AVUM
21111	MNT HANGAR AVIM		
214	VEHICLE MAINT	21407	NG MAINT FAC
21409	AR MAINT FAC		
21410	VEH MNT SH ORG		
21420	VEH MNT SHOP DS		
21800	SP PURP MNT SHP		
21900	MNT INST O&R		

30. MAINTENANCE FLEXIBILITY

a. DEFINITION: Maintenance flexibility is the ability to perform maintenance on a variety of different commodities.

b. PURPOSE: To measure a plant's maintenance flexibility which enables maintenance capabilities to be changed as demands change for different products and the ability to absorb varied workloads.

c. METHODOLOGY: Maintenance capabilities considered range from a single commodity to the full range of maintenance for all items of Army equipment. Inflexible capability refers to the inability to convert from one product line to another without a major conversion effort. This attribute will be measured by assigning points to each of the 13 Commodity areas categorized in the Depot Maintenance Requirements database (OP-29). Points will be assigned to each commodity and weighted based on a subjective evaluation of the relative facilitization required to repair each commodity. Depots will receive a corresponding value for each of the commodities that are included in their current workload and for commodities that could be repaired with no additional facilitization (except DMPE).

31. MANEUVER ACRES

a. DEFINITION: The net total acreage of the installation available for maneuver and training.

b. PURPOSE: To measure the overall land size of the installation available for maneuver and field training which is an important element in stationing and training land forces. This is one of several factors used to assess the relative size of installations.

c. METHODOLOGY: Summation of the total maneuver acreage identified in HQRPLANS as verified by MACOMs and validated by installations. Maneuver acreage will include only land used as maneuver and training area. Impact areas, cantonment areas, ranges, off limits areas, and environmentally sensitive areas that are considered unusable will not be included. Maneuver rights areas will be included in computations at a value of one half of the value of Army-Owned Acres.

32. MCA COST FACTOR

a. DEFINITION: Measure of the relative cost factor for construction at an installation.

b. PURPOSE: Indicates the relative difference between installations for construction of the same facility. Provides relative index on cost of capital investment for modernization or expansion of facilities. This is one of a series of factors used to access the relative cost of operations of an installation.

c. METHODOLOGY: Index values from the Area Cost Factors and Unit Prices for FY 1996-1997.

33. MECHANIZED MANEUVER ACRES

a. DEFINITION: Measures the largest contiguous acreage of the installation available for maneuver and training of mechanized formations.

b. PURPOSE: To measure the largest parcel of land available to the installation for training maneuvers of mechanized forces. This measure places added weight to the maneuver acres that can be used to train mechanized forces.

c. METHODOLOGY: Calculate the acreage of the installation's largest contiguous maneuver area as noted on the current training area regulations. A maneuver rights area could be counted when the area is easily accessible to the installation and commonly used for training large mechanized formations. Maneuver acreage will include only land used as maneuver and training area. Impact areas, cantonment areas, ranges, off limits areas, and environmentally sensitive areas that are considered unusable will not be included.

34. MEDICAL RESEARCH FACILITIES

a. DEFINITION: Laboratory activities, Research Facilities. Research facilities must have suitably equipped facilities to operate efficiently.

b. PURPOSE: To measure laboratories and other research facilities used in support of Medical Centers.

c. METHODOLOGY: Assets are determined by summing the square footage from the FCG 3900 series and installation validation.

35. MISSION OVERHEAD

a. DEFINITION: Mission Overhead is a measure of the relative cost of providing production/maintenance capacity. Mission overhead includes, as an example, Production Support Functions, Indirect Labor, Materiel Adjustments, Equipment Management, and Depreciation/Amortization of production equipment and facilities.

b. PURPOSE: To measure the overall economic indicator concerning the efficiency of production/maintenance operations of the facility. This is one of a series of factors used to assess the relative cost of operation of an installation.

c. METHODOLOGY: Under the Defense Business Operations Fund (DBOF), cost accrual accounting systems are required to produce the actual cost of the product to the customer. This factor is an identifiable cost associated with the production/maintenance facility DBOF stabilized rate used to bill costs to DBOF customers.

36. MOBILIZATION CAPABILITY

a. DEFINITION: Capability of an installation to support the reconstitution of forces through the ability to billet, train, and deploy soldiers.

b. PURPOSE: To measure an installation's capacity to train, equip and deploy units in a time of national emergency. The Army's "Mobilization Stationing Strategy and Requirements Study" identified five critical mobilization attributes that an installation should possess: (1) billeting; (2) deployment network; (3) maintenance facilities; (4) ranges and training; and (5) geographic dispersion.

c. METHODOLOGY: A Decision Pad submodel is used with the following weights given to each sub-element:

MEASURE	Points
Mobilization billets	10
Deployment Network	10
Ranges	10
Net Maneuver Acres	10
Contiguous Maneuver Acres	10
Work Space	10
Total	60

37. MOBILIZATION THROUGHPUT

a. DEFINITION: Capability of a port installation to expand its support during mobilization or a contingency.

b. PURPOSE: Measure ability to load and unload equipment during mobilization or a contingency.

c. METHODOLOGY: Measurement of the maximum daily throughput capacity.

38. NORMAL THROUGHPUT

a. DEFINITION: Normal throughput capacity is the average material, cargo and equipment that can be loaded and unloaded a daily basis.

b. PURPOSE: Measure a ports capability to load and unload material and equipment.

c. METHODOLOGY: Use the Average measurement tons per day throughput capacity as given by the referenced report.

39. OPS/ADMIN FACILITIES

a. DEFINITION: Total square footage of permanent facilities used for operational/administrative functions.

b. PURPOSE: To measure the installation capacity for providing permanent general purpose administrative and operational facilities. This is one of several factors used to assess the relative capability and suitability of the installation's facilities to support forces.

c. METHODOLOGY: Summation of the total square feet of an installation's permanent operations/administrative facilities for the Essential Elements of Analysis (EEA) and Facility Category Groups (FCG) shown below:

EEA	EEA DESCRIPTION	FCG	FCG DESCRIPTION
141	UNIT OPS BLDGS	14112	AV UNIT OPS BLDG
140	OPERATIONS	14110	AF OPS BLDG
650	ADMINISTRATION	14182	BDE HQ BLDG
		14183	BN HQ BLDG
		14185	CO HQ BLDG
		61050	GEN PURPOSE ADMIN

New construction projects, funded in the FY 91 - FY 95 Military Construction Program are counted as existing assets.

40. PATIENT CARE FACILITIES

a. DEFINITION: The total space used for patient care at a medical treatment facility.

b. PURPOSE: To measure an MTFs ability to treat and care for patients.

c. METHODOLOGY: Summation of all space used for patient treatment.

41. PERCENT PERMANENT FACILITIES

a. DEFINITION: Total square footage of all existing permanent buildings divided by total installation facilities square footage. This is a quality measure to reflect construction investment and WWII Wood elimination.

b. PURPOSE: To indicate the overall quality of the installation's facilities. The age of facilities is an indirect measurement of the quality of the installation's facility structure. Newer buildings are more comfortable, economical and safer than old buildings.

c. METHODOLOGY: Used total square footage of all existing permanent buildings divided by total installation facilities square footage. Projects in the FY 91 - FY 95 Military Construction Program are counted as existing permanent assets.

42. PIERS AND WHARVES

a. DEFINITION: Deep water accessibility and sufficient water at pier side at mean low tide to permit loading of vessels.

b. PURPOSE: To determine the capacity of the terminal to perform its mission.

c. METHODOLOGY: Developed three factors to describe the pier structure of a Port facility:

Measurement of water depth: Water depth measured in feet Actual water depth data maintained by HQMTMC Engineer.

Type vessels Accommodated:	RORO	yes = 5 pts
	LOLO	yes = 5 pts
	Container	yes = 5 pts
	Heavy Lift	yes = 5 pts

Length of Pier in feet: Data maintained by HQMTMC Engineer.

43. PRODUCTION FLEXIBILITY

a. DEFINITION: Production flexibility is the ability to produce a variety of different commodities.

b. PURPOSE: To measure a plant's production flexibility which enables maintenance capabilities to be changed as demands change for different products and the ability to absorb varied workloads.

c. METHODOLOGY: Production capabilities considered range from a single commodity to the full range of maintenance for all items of Army equipment. Inflexible capability refers to the inability to convert from one product line to another without a major conversion effort. This attribute will be measured by assigning points to each of 12 Commodity areas (Aircraft, Automotive, Combat Vehicles, Construction, Communications/Electronics, Missiles, Watercraft, Munitions, Weapons, Rail, General Equipment, and Other). Points will be assigned to each commodity and weighted based on a subjective evaluation of the relative facilitization required to produce each commodity. Industrial facilities will receive a corresponding value for each of the commodities that are included in their current workload and for commodities that could be repaired with no additional facilitization (except DMPE).

44. QUANTITY - DISTANCE

a. DEFINITION: The quantity of explosives material and distance separation relationships provide defined types of protection. These relationships are based on levels of risk considered acceptable for the stipulated exposures and are tabulated in the appropriate Quantity Distance tables.

b. PURPOSE: To determine whether an installation requires waivers due to inadequate buffer zones.

c. METHODOLOGY: Specified Quantity-Distance Tables determine whether waivers are required for storage of ammunition. The preferred situation is an installation that can store ammunition without waivers.

45. RANGES

a. DEFINITION: The total number of firing points equipped with the Remote Target System (RETS), the number of Multi-Purpose Range Complexes (MPRC) and the availability of a standard design MOUT range and total number of ranges are weighted and combined to provide a measure of the overall capability of the installation's range structure.

b. PURPOSE: To evaluate the capability of the installation to support range operations such as qualification and live fire exercises.

c. METHODOLOGY: A Decision Pad submodel is used with the following weights given to each sub-element:

NUMBER OF MPRC RANGES	45 points
NUMBER OF RETS EQUIPPED FIRING POINTS	45 points
STANDARD MOUT RANGE AVAILABLE? YES =	5 points
TOTAL NUMBER OF RANGES	5 points
Total	100 points

46. RESEARCH AND DEVELOPMENT FACILITIES

a. DEFINITION: Laboratory activities, environmental control chamber facilities, Research and Development Facilities. R & D facilities must have suitably equipped facilities to operate efficiently.

b. PURPOSE: To measure laboratories and other research facilities used in support of material development.

c. METHODOLOGY: Assets are determined by summing the permanent square footage from the 300 and 200 series EEAs. This sum is only for the FCGs that are measured in square feet.

47. RESERVE TRAINING

a. DEFINITION: A measure of support provided by an installation to the Reserve Components, including individual and unit training.

b. PURPOSE: To evaluate an installation on available capacity to support Reserve Component units and individuals during peacetime.

c. METHODOLOGY: Reserve Component support is evaluated using a Decision Pad submodel measuring and ranking the Annual Training (AT), Inactive Duty Training (IDT). Each of the above factors is measured for each installation. The raw data is used in the model and a weighted average score is calculated for each installation. This score will be calculated by taking a three-year average (FY 91-93).

48. SPECIAL AIRSPACE

a. DEFINITION: The total cubic area of special use airspace operated by the installation.

b. PURPOSE: To measure the overall special use air space of the installation under military control. This is one of several factors used to assess the relative size of the training area(s) controlled by installations.

c. METHODOLOGY: The airspace dimensions (longitude, latitude and altitude) identified in the us Army Airspace Master Plan is converted to cubic miles. The result is provided for MACOM and installation verification.

49. SPECIAL CARGO CAPABILITY

a. DEFINITION: Adequacy of the port facility to handle special cargo requirements.

b. PURPOSE: To indicate the terminal's ability to provide responsive and timely support to customers during peacetime, mobilization, and wartime.

c. METHODOLOGY: Assessment of the capability of the port to handle special cargo. (1) Hazardous material yes = 50 points
(2) Ammunition yes = 50 points

50. STAGING AREAS

a. DEFINITION: Total Square feet of hard surface area at the terminal used for staging cargo prior to loading on the ship.

b. PURPOSE: To determine the terminal's capacity to perform its mission.

c. METHODOLOGY: Measurement of hard surface staging square feet.

51. SUPPLY AND STORAGE FACILITIES

a. DEFINITION: Total permanent square footage of Supply and Storage facilities on an installation.

b. PURPOSE: To measure the installation capacity for providing permanent storage facilities. This is a measure used to assess the relative capability and suitability of the installation's facilities to support forces.

c. METHODOLOGY: Summation of the total number of permanent square feet of supply and storage facilities for the following Facility Category Groups (FCG) shown below:

FCG	FCG DESCRIPTION
43200	Cold Storage - Inst
44100	Gen Purp Whse - Dep
44200	Gen Purp Whse - Inst
44230	Cont Hum Whse
44240	Infl Matls Whse
44260	Veh Stor Shed

New construction projects in the FY 91 - FY 95 Military Construction Program are counted as existing assets.

52. SUPPORT FACILITIES

a. DEFINITION: Facilities providing logistical support for the primary mission.

b. PURPOSE: To indicate the capacity of the terminal to provide logistical support.

c. METHODOLOGY: Measurement of logistical facilities square footage.

53. TEST AND EVALUATION FACILITIES

a. DEFINITION: Square feet of all test and evaluation facilities and value of all installed test equipment.

b. PURPOSE: To measure the ability of an installation to conduct test and evaluation missions.

c. METHODOLOGY: A D-Pad submodel is used giving equal weight to facilities and equipment. Facilities assets are determined by summing the square footage from the category code groups listed in 39010 series of HQRPLANS. Equipment assets are determined by summing all equipment (over $100,000 in value) from the TESTFACTS database. Each type of asset is given equal weight.

54. TEST AND EVALUATION MISSION DIVERSITY

a. DEFINITION: The total number of test and evaluation missions that are performed on the installation.

b. PURPOSE: To measure the number of missions that can be performed on an installation.

c. METHODOLOGY: Sumation.

55. TEST AND EVALUATION RANGES

a. DEFINITION: The total number of test and evaluation ranges on the installation and the total impact acres available on an installation.

b. PURPOSE: To measure the number and size of test and evaluation ranges on an installation.

c. METHODOLOGY: A D-Pad submodel is used giving equal weight to Number and Size of ranges. Number of ranges are determined by summing the total number of individual ranges from the series 371 category code group from HQRPLANS. Size of ranges is determined by the total number of impact acres available on the installation.

56. VARIABLE HOUSING ALLOWANCE (VHA) FACTOR

a. DEFINITION: Measure of the cost of variable housing allowance for military personnel living off-post.

b. PURPOSE: To measure cost of housing military personnel in communities surrounding the installation. This is an indicator of the location cost to the Army for assignment of military personnel to the installation.

c. METHODOLOGY: Used the information from the VHA Zip Code Microfiche, distributed to Finance Offices by ASA(FM), for January 1993. Summation of the "with dependents" rate for E5, W3 and 03 as representative of the grades at these installations.

57. WORK SPACE

a. DEFINITION: Work space is defined as the total permanent square footage of maintenance (aviation and vehicle) facilities and operational/administrative facilities on the installation.

b. PURPOSE: To measure the installation capacity for providing permanent maintenance, general purpose administrative and operational facilities. This is a measure used to assess the relative capability and suitability of the installation's facilities to support forces.

c. METHODOLOGY: Summation of the total number of permanent square feet of operations/administrative and maintenance facilities for the Essential Elements of Analysis (EEA) and Facility Category Groups (FCG) shown below:

EEA	EEA DESCRIPTION	FCG	FCG DESCRIPTION
210	AVIATION MAINT	21110	MNT HANGAR AVUM
21111	MNT HANGAR AVIM		
214	VEHICLE MAINT	21407	NG MAINT FAC
21409	AR MAINT FAC		
21410	VEH MNT SH ORG		
21420	VEH MNT SHOP DS		
21800	SP PURP MNT SHP		
21900	MNT INST O&R		
141	UNIT OPS BLDGS	14112	AV UNIT OPS BLDG
140	OPERATIONS	14110	AF OPS BLDG
650	ADMINISTRATION	14182	BDE HQ BLDG
14183	BN HQ BLDG		
14185	CO HQ BLDG		
61050	GEN PURPOSE ADMIN		

New construction projects in the FY 91 - FY 95 Military Construction Program are counted as existing assets.

APPENDIX E

BRAC 95 ATTRIBUTE WEIGHTS

BRAC 95 INSTALLATION ASSESSMENT ATTRIBUTE WEIGHTS	MANUVER	TRAINING	SCHOOLS	PROED	C&C	PORTS	MEDICAL
ACCESSIBILITY					50		
APPLIED INSTRUCTIONAL FACILITIES			60	135			100
AVAILABLE WORK FORCE						10	
AVERAGE AGE OF FACILITIES	25	25	25	25	40	75	85
BARRACKS (UPH)		60	40	20			
BARRACKS + FAMILY HOUSING	60				140		
BASOPS/MISSION POPULATION	60	75	60	60	60	100	
BUILDABLE ACRES	35	35	35	35	60	30	35
COST OF LIVING INDEX	50	60	50	50	50	50	40
DEPLOYMENT NETWORK	60	30	35				75
ENCROACHMENT	25	20	25	25	25		20
ENVIRONMENTAL CARRYING CAPACITY	25	25	25	25	25	25	25
FAMILY HOUSING			20	40			
FAMILY HOUSING COST PER UNIT	15		15	15	15		15
GENERAL INSTRUCTIONAL FACILITIES			60	235			
HEALTH CARE SUPPORT INDEX							100
IMPACT ACRES	70	70	40				

BRAC 95 INSTALLATION ASSESSMENT ATTRIBUTE WEIGHTS	MANUVER	TRAINING	SCHOOLS	PROED	C&C	PORTS	MEDICAL
INFORMATION MISSION AREA	10	10	30	30	70	10	20
INFRASTRUCTURE	25	25	25	25	40	60	40
MAINTENANCE FACILITIES					40		
MANUVER ACRES	80	120	65				
MCA COST FACTOR	30	30	30	30	30	50	30
MECHANIZED MANUVER ACRES	70	80	20				
MEDICAL RESEARCH FACILITIES							50
MOBILIZATION CAPABILIY	55	30	65	65	40		50
MOBILIZATION THROUGHPUT						50	
NORMAL THROUGHPUT						100	
OPS/ADMIN FACILITIES					140		
PATIENT CARE FACILITIES							150
PERCENT PERMANENT FAC	30	30	30	30	40	65	75
PIERS AND WHARVES						100	
RAIL AND ROAD SUPPORT						100	
RANGES	70	70	45				
RESERVE TRAINING	60	70	30	50	50		75
SPECIAL AIRSPACE	40	40	65				
STAGING ARES						75	
SUPPLY AND STORAGE FAC					40		
SUPPORT FACILITIES						75	
VHA FACTOR	15		15	15	15		15
WORK SPACE	60	60	60	60			
TOTAL	1000	1000	1000	1000	1000	1000	1000

BRAC 95 INSTALLATION ASSESSMENT ATTRIBUTE WEIGHTS	STORAGE	PROD	DEPOT	COMMOD	INDUST	PROVING
AMMUNITION STORAGE	240	130				
AVAILABLE WORK FORCE	40	30	30	50	30	25
AVERAGE AGE OF FACILITIES	50	50	75	75	75	75
BASOPS/MISSION POPULATION	100	100		100	100	100
BUILDABLE ACRES	35	35	20	90	35	25
CAPACITY - PRODUCTION		130			230	
CAPACITY - MAINTENANCE			150			
CAPACITY - SUPPLY			150			
COST OF LIVING INDEX	50	50		50	50	50
DEPLOYMENT NETWORK	80	50	50		50	
ENCROACHMENT	30	15	15		30	65
ENVIRONMENTAL CARRYING CAPACITY	25	25	25	25	25	25
EXCESS CAPACITY - MAINTENANCE			40			
EXCESS CAPACITY - PRODUCTION		65			50	
EXCESS CAPACITY - STORAGE	50		40			
INFORMATION MISSION AREA	10	10	10	35	10	10
INFRASTRUCTURE	25	35	50	50	50	50
INSTALLATION AND BASE OPERATING EXPENSE			100			
MAINTENANCE FLEXIBILITY	50		40			
MCA COST FACTOR	50	50	50	50	50	50
MISSION OVERHEAD			50			
OPS/ADMIN FACILITIES				200		
PERCENT PERMANENT FACILITIES	50	45	75	75	75	75
PRODUCTION FLEXIBILITY		80			60	

BRAC 95 INSTALLATION ASSESSMENT ATTRIBUTE WEIGHTS	STORAGE	PROD	DEPOT	COMMOD	INDUST	PROVING
QUANTITY - DISTANCE	75	70				
RESEARCH AND DEVELOPMENT FACILITIES				200		
RESERVE TRAINING	40	30	30			
SUPPLY AND STORAGE FACILITIES					80	
TEST AND EVALUATION FACILITIES						150
TEST AND EVALUATION FLEXIBILITY						100
TEST AND EVALUATION RANGES						200
TOTAL:	1000	1000	1000	1000	1000	1000

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